



**NEW
LOOK!**

Features easier-to-read
product information

Crop Protection 2011

Government
of Alberta

AGDEX 606-1

Disclaimer

This publication is intended to be used as a guide only. Information contained here is that available at the time of printing (February 2011). While every effort has been made to ensure accuracy, Alberta Agriculture and Rural Development does not accept responsibility for label changes, errors in conversion or otherwise. It remains the responsibility of the readers to follow product information contained on the product label or package insert. The publisher, editor and all contributors to this publication cannot be held responsible for publication errors or any consequence resulting from the use of this publication.

Note: Some approved minor use registrations may not appear on the product label. Check with product write-up for details.

All recommendations in this publication are given in quantity of commercial product per acre (L or kg/ac). Product labels are given in quantity of product per hectare (L or kg/ha). To avoid application errors, be sure to read and understand label recommendations.

Warning

The use of a pesticide in any manner not published on the label or registered under the *Minor Use of Pesticides* regulation constitutes an offence under both the *Federal Pest Control Products Act* and *Alberta's Environmental Protection and Enhancement Act*.

Questions or concerns, contact:

Alberta Ag-Info Centre
Phone: 310-FARM (3276)

Copies of this publication may be obtained from:

Publications Office
Alberta Agriculture and Rural Development
Phone: 1-800-292-5697 (toll free in Canada)
(780) 427-0391

or

see our website <www.agriculture.alberta.ca> for information on other publications, videos and CD-Roms

Revised 2011 02



CROP PROTECTION 2011

Edited by

Harry Brook and Mark Cutts

Alberta Agriculture and Rural Development
in co-operation with the agro-chemical industry

Published by:

Alberta Agriculture and Rural Development
Agriculture Information Services
7000 - 113 Street
Edmonton, Alberta
Canada T6H 5T6

Editorial Services: Mirza Baig

Production Editor: Chris Kaulbars

Graphic Designer: John Gillmore

Page Production: J.A. Serafinchon

Copyright © 2011. All rights reserved by her Majesty the
Queen in the right of Alberta.

No part of this publication may be reproduced, stored in a
retrieval system, or transmitted in any form or by any means,
electronic, mechanical photocopying, recording or otherwise
without written permission from Agriculture Information
Services, Alberta Agriculture and Rural Development.

ISSN -1201-5059

Printed February 2011

Contents

	Page/s		Page/s
Addresses and Telephone Numbers –		First Aid	33
Chemical Companies	1	Poison information centres	33
Leaf Stages – Cereals and Grasses	3	Standard first aid measures	33
Leaf Stages – Broadleaf Weeds	4	Glossary of Terms in Pest Control	34
Cereal Growth Stages	5	Alberta Agriculture and	
Pea Node Leaf Stages	6	Rural Development Offices	35
Bean Leaf Stages	7	Herbicides	
Lentil and Chickpea Leaf Stages	8	Herbicide Index	36
How to Use This Book	9	Chemical weed control in Alberta	39
Chemical Pest Control Summary	9	Water used for spray application	40
Sprayer Operations	10	Pesticide resistance	41
Sprayer calibration	11	Herbicide group classification by	
Standard benchmarks	11	mode of action	42
Calibrating small sprayers	12	Herbicides	47
Preparation and Application of Pesticides	12	Herbicide Selector Charts	428
Tank Mixtures	12	Insecticides	
Adjuvants (surfactants, wetting agents,		Insecticide Index	289
spreaders, etc.)	13	Chemical insect control in Alberta	290
Preparing a tank mix	12	Insecticide group classification by	
Specific mixing instructions	13	mode of action	295
Sprayer clean-out	14	Insecticides Selector Charts	297
What to do if results are unsatisfactory	16	Insecticides	301
Pesticides and the Environment	16	Seed Treatments	
Responding to a pesticide related concern	16	Seed Treatments Index	339
Pesticide residues found in Alberta water		Seed treatment of cereal, forage,	
sources	17	oilseed and pulse crops	340
Pesticide applicator certificate	17	Seed Treatment Selector Charts	341
Farmer certification requirements	17	Fungicide group classification by	
Pesticide user responsibility	18	mode of action	346
Pesticide Container Site Locations	22	Seed Treatments	348
Safety Precautions	25	Fungicides	
Warning symbols	25	Fungicide Index	379
Pesticide toxicity, hazard and risk	25	Chemical control of plant diseases in	
Reducing the risk of exposure to pesticides	26	Alberta	380
Protective clothing and equipment	27	Fungicides Selector Charts	381
Cleaning of Clothes and Equipment	30	Fungicides	385
Specific cleaning procedures for pesticides	31	Pesticide Application Records	486
Other Precautions and Safety Tips	32		
Grazing and haying restrictions	32		
Farm safety program	32		

Address and Telephone Numbers

Chemical Companies

Adjuvants Plus Inc.

1755 Division Road North
Kingsville, ON N9Y 2Y8
Toll Free: 1-877-512-4659

Arysta LifeScience Canada, Inc.

998, 105 - 150 Crowfoot Crescent N.W.
Calgary, AB T3G 3T2
Toll Free: 1-866-761-9397
Fax: 1-866-231-8957
Website: arystalifescience.com

BASF Canada

100 Milverton Drive, 5th Floor
Mississauga, ON L5R 4H1
(416) 675-3611 Toll Free: 1-877-371-2273
Website: www.agproducts.basf.com

Bayer CropScience Inc.

#100, 3131 - 114 Avenue S.E.
Calgary, AB T2Z 3X2
1-888-283-6847
Website: www.bayercropscience.ca

Cheminova Canada

5915 Airport Road, Suite 316
Mississauga, ON L4V 1T1
(905) 405-1923 Toll Free: 1-888-316-6260
Website: www.cheminova.com

Chemtura Co.

25 Erb Street
Elmira, ON N3B 3A3
1-800-350-1745

Dow AgroSciences Canada Inc.

#2100, 450 - 1 Street S.W.
Calgary, AB T2P 5H1
Toll Free: 1-800-667-3852
24 Hour Emergency: 1-613-996-6666
Website: www.dowagro.ca

E.I. duPont Canada Co.

4444 - 72 Avenue S.E.
Calgary, AB T2C 2C1
Toll Free: 1-800-667-3925
Website: www.dupont.ca/ag

Engage Agro Corporation

1030 Gordon Street
Guelph, ON N1G 4X5
(519) 826-7878 Toll Free: 1-800-900-5487
Website: www.engageagro.com

Gowan Company

P.O. Box 5569
Yuma, AZ 85366-5569
Toll Free: 1-800-833-5720
Website: www.gowanco.com

Interprovincial Co-operative Limited

945 Marion Street
Winnipeg, MB R2J 0K7
(204) 233-3461
Website: www.ipco.ca

MANA Canada

56 Hampton Crescent
London, ON N6H 2N9
(519) 601-1945
For product service call -
United Agri-Products Canada Inc,

Monsanto Canada Inc.

67 Scurfield Blvd.
Winnipeg, MB R3Y 1G4
Toll Free: 1-800-667-4944
Website: www.monsanto.ca

Norac Concepts Inc.

P.O. Box 31097
Guelph, ON N1H 8K1
(519) 821-3110
24 Hour Emergency: (613) 787-5620
Website: www.noracconcepts.com

Nufarm Agriculture Inc.

5507 - 1st Street S.E.
Calgary, AB T2H 1H9
Toll Free: 1-800-868-5444
24 Hour Emergency: 1-800-424-9300
Website: www.nufarm.ca

Peacock Industries Inc.

Box 750
Hague, SK S0K 1X0
(306) 225-4691
Website: www.grasshoppercontrol.com

Syngenta Crop Protection Canada Inc.

#300, 6700 MacLeod Trail South
Calgary, AB T2H 0L3
Toll Free: 1-877-964-3682
24 Hour Emergency: 1-800-327-8633
Website: www.syngenta.ca

United Agri Products Canada Inc.

789 Donnybrook Drive
Dorchester, ON N0L 1G5
Info Line: 1-800-561-5444
24 Hour Emergency: 1-800-561-8273
Website: www.uap.ca

Valent Canada, Inc.

107 Woodlawn Road West, Suite 502-B
Guelph, ON N1H 1B4
(519) 822-7043
www.valent.ca

Pest Management Regulatory Agency

The Pest Management Regulatory Agency (PMRA) of Health Canada is responsible for providing safe access to pest management tools, such as pesticides and sustainable pest management strategies, while minimizing risks. The Agency registers all pest control products that may be used in Canada. It also re-evaluates the existing pesticides available to the agriculture, forestry, manufacturing and other sectors. PMRA's risk-management approach to regulatory decision-making involves objective, scientific assessment of the risks to human health and the environment, while considering the need for a pest control product. Therefore, growers and consumers are better protected and have access to the information regulatory decisions are based on.

If there are questions or inquiries regarding pesticides, product labels or safety precautions, contact PMRA at the following phone numbers:

Edmonton 780-495-7014

Calgary 403-292-4106

Lethbridge 403-382-4794

National toll free number: 1-800-267-6315 – Pest Management Information Service

Visit our website: <http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php>

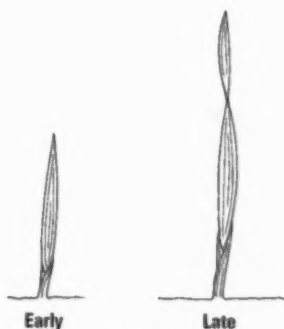
On line versions of the current labels are available via the following link:
<http://www.hc-sc.gc.ca/cps-spc/pest/registrant-titulaire/tools-outils/label-etiq-eng.php> or

go to the PMRA Homepage at

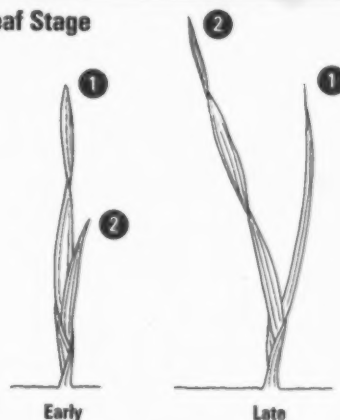
<http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php> then select "Quick links" and then select "Label Search" and save it on your favourites.

Leaf Stages - Cereals and Grasses

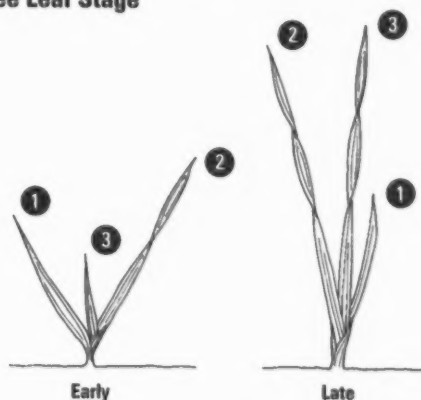
One Leaf Stage



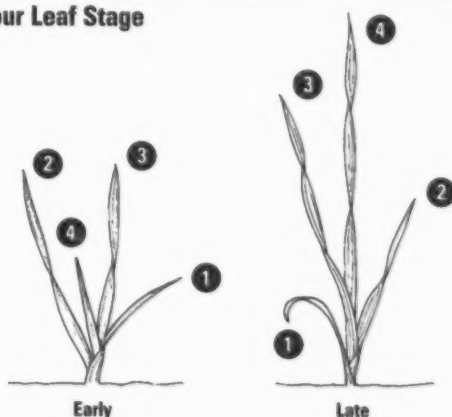
Two Leaf Stage



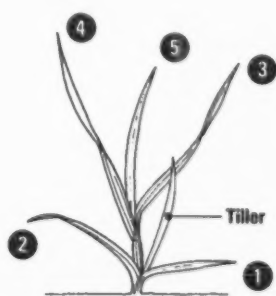
Three Leaf Stage



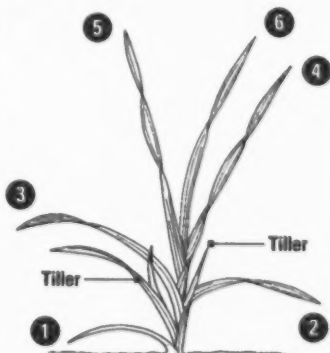
Four Leaf Stage



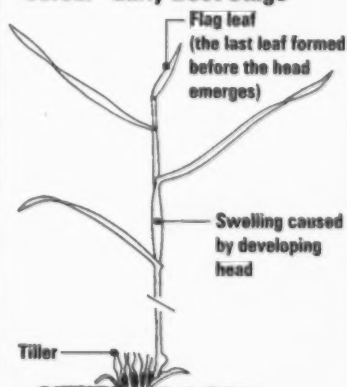
Five Leaf Stage
With one tiller



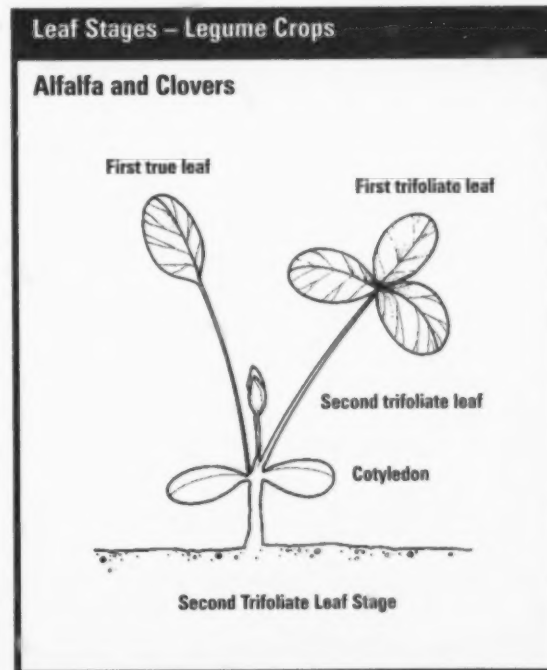
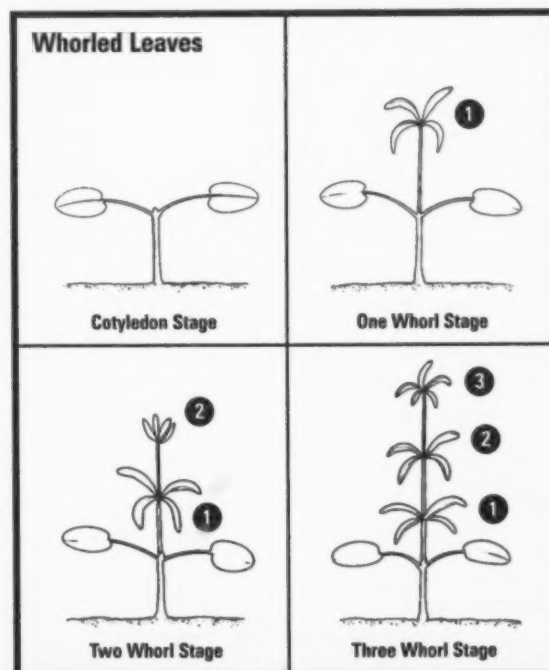
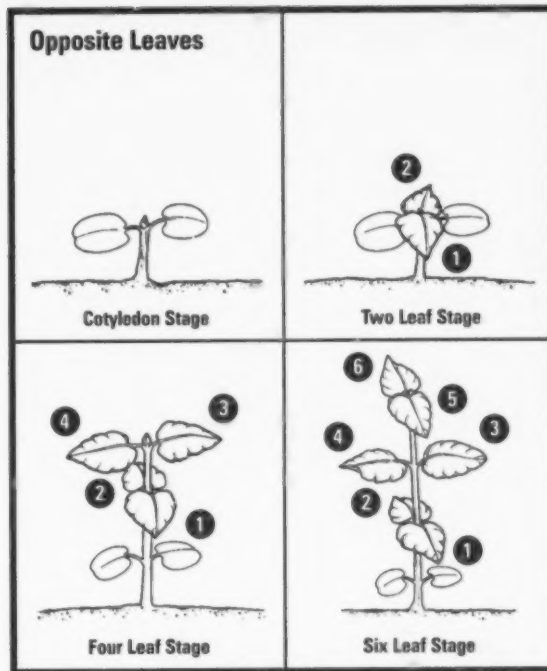
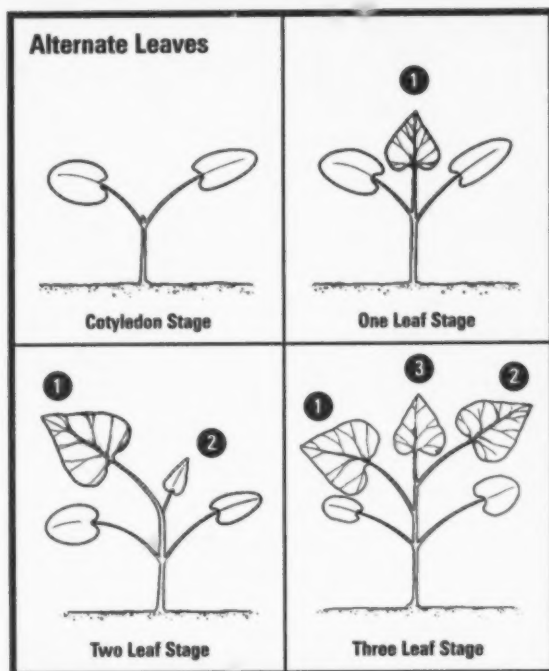
Six Leaf Stage
With two tillers



Cereal - Early Boot Stage

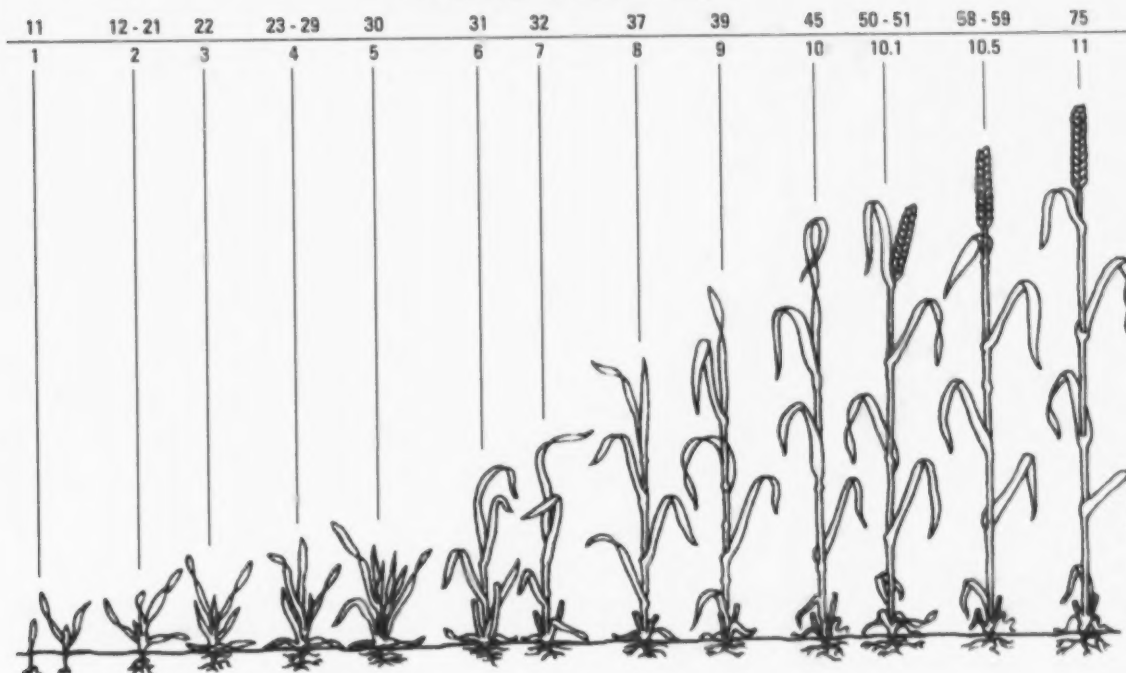


Leaf Stages – Broadleaf Weeds



Cereal Growth Stages

Zadoks Decimal Growth Stages



Feekes Large Growth Stages

One leaf	Two tillers formed	Leaf sheaths strongly erect	Second node detectable	Ligule of flag leaf just visible	First ear just visible	Ripening
	Tillering begins	Leaf sheaths lengthen	First node detectable	Flag leaf just visible	Boots swollen	All ears out of sheath

The Feekes and Zadoks scales define the growth stages of a relatively uniform cereal crop. Completion of these growth stages by the cereal crop will be influenced greatly by soil temperature, moisture, air temperature and day length. For example, stages 2 to 5 in the Feekes scale may take 5 or 6 weeks, whereas stages 6 to 10 may be completed in 2 to 3 weeks under prairie conditions.

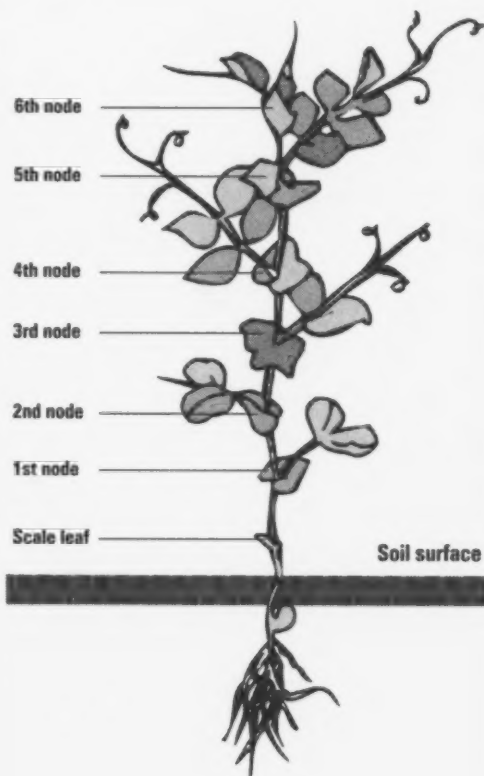
To establish the growth stage of a cereal crop using either of these scales, it is necessary to collect a random sample of plants to determine the level of growth attained by the majority of the plants.

Under good growing conditions, examination of up to 10 random selected plants may be appropriate. Under conditions of uneven germination and low soil moisture, growth stage assessment may require larger samples.

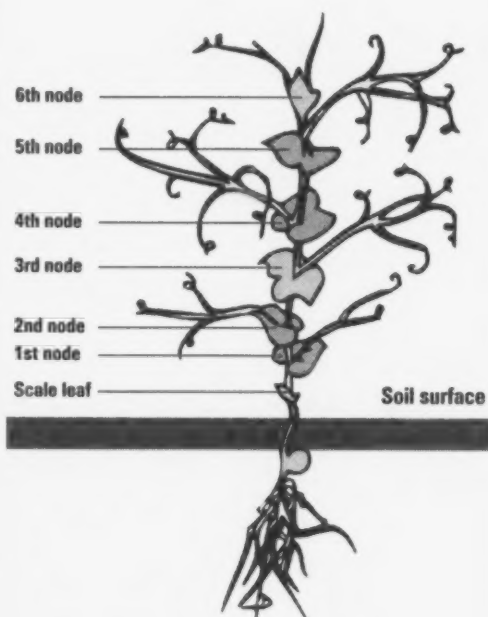
Application of an agrochemical must be timed precisely to maximize the desired effect on the target crop. All agrochemical applications (fungicides, growth regulators, herbicides, or supplemental nutrients) must be based on physiological growth stage of the crop. Applications based on calendar days are less accurate and will be less successful.

Pea Node Leaf Stages

Normal Leaf Type



Semi-leafless Type



Bean Leaf Stages

© 1997 BASF Canada Inc. All rights reserved. Reproduction of this document is prohibited without written permission from BASF Canada Inc.

Unifoliate



1st Trifoliate



3rd Trifoliate



4th Trifoliate

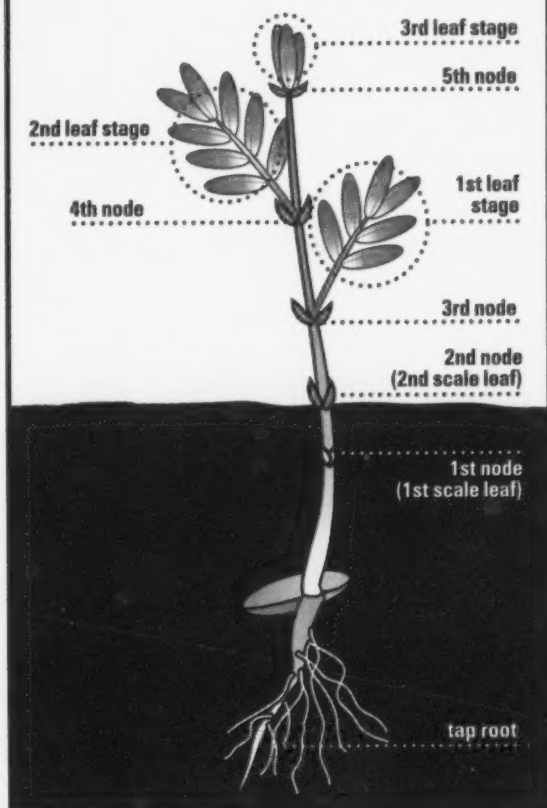


Source: BASF Canada

Acknowledgement: Technical expertise from Dr. Al Slinkard.

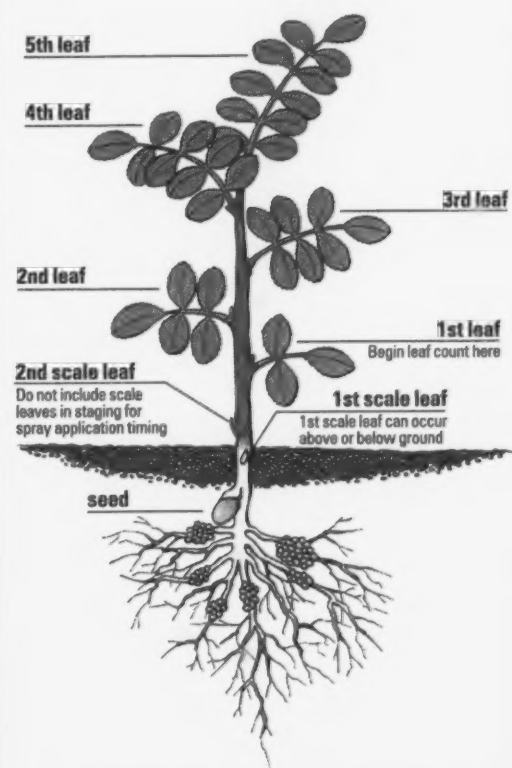
Lentil and Chickpea Leaf Stages

Lentil - seedling at 3rd leaf stage



Lentil drawing courtesy of Saskatchewan Pulse Growers.

Chickpea



Source: BASF Canada

Acknowledgement: Technical expertise from Dr. Al Slinkard.

How to Use This Book

This publication assists in the selection and application of pesticides. The pesticides are grouped into four main sections: herbicides, insecticides, seed treatments and foliar fungicides. Each section is indexed separately.

The 2011 Crop Protection book has a different look with all the registrations this year. The format for all pesticide entries has been changed to make the information easier to read and to keep the manual compact enough to be useful. The manual will continue to provide necessary information to help producers select and use appropriate pesticide products for their field crops.

Use the pesticide selector charts and the detailed pesticide descriptions to choose the most appropriate chemicals. To select a suitable pesticide, follow these steps:

- Identify the pest(s).
- Refer to the chart for weed or insect pests, and record the pesticide(s) available.
- Refer to the appropriate pesticide(s) in the text, and select the product best suited to your operation.
- Apply the pesticide strictly according to instructions given on the label attached to the product container.

Chemical Pest Control Summary

Know your problem(s).

- Identify the pest(s).
- Estimate infestation level or probable economic loss to determine if treatment is required.
- Know the crop variety. Some products are restricted to, or excluded from, use on specific crop types or varieties.
- If necessary, note soil type or texture of the area to be treated.

If chemical control is necessary, choose a pesticide based on the following criteria:

- Registered products for the given crop (tank mixes may have separate recommendations).
- Pests controlled by the product.
- Crop and pest stage of growth or development.
- Recommended application time (e.g. spring, summer, fall; time of day).
- Cropping and/or harvest restrictions of product(s) considered.
- Use the least toxic, suitable product.

Read product label directions for:

- Recommended rate(s) for the particular pest, infestation level, crop and field conditions.
- Method of application.
- Any application restrictions during adverse or extreme weather conditions.
- Any other restrictions, cautions or special instructions.

Clean, prepare, maintain application equipment.

- Lubricate and repair equipment to get the best possible performance.
- Clean spray tank of residues to prevent crop damage or problems with equipment.
- Clean, calibrate and, if necessary, replace spray nozzles.
- Check pump and pressure system.

Safely prepare pesticides for application.

- Use protective clothing and recommended safety equipment; the exposure hazard is greatest during mixing.
- Follow the mixing instructions.
- Use the specified amount and quality of water.
- Use recommended rates (tank mix rates may be different from each pesticide used alone).
- If specified, add adjuvants.
- Record the following: rates used, mix order, pesticides and adjuvants used as well as water quality for future reference.

Apply pesticides using:

- Recommended safety precautions and equipment.
- Proper application equipment.
- Recommended rates of pesticides, adjuvants and water.
- Proper time (e.g. growth stage, time of day, season).
- Recommended techniques (e.g. ground speed, pressure, incorporation).
- Record weather conditions at time of application, techniques used, growth stage of crop and pests for future reference.

Sprayer Operations

A summary of sprayer operations is presented in this publication.

Getting the sprayer ready:

- Preliminary maintenance, adjustments and settings must be made according to the operator's manual.
- The entire sprayer system should be cleaned and rinsed.
- Ensure that all nozzles are the same size and spray angle by checking the code number on the nozzle tip.
- Partially fill sprayer tank with clean water.
- Check the pump for adequate output. If the desired spraying pressure can be achieved with the agitator and boom valves open, the pump output is okay.
- Check accuracy of main sprayer gauge by installing a new gauge on the boom end temporarily and compare the pressure readings. The readings should be identical.
- Inspect spray patterns and replace tips that have streaky patterns. Flat fan nozzles should be aligned, so the patterns do not interfere with each other.

Sample Nozzle Chart

Nozzle number	Pressure kPa	Litres per minute	Litres per acre (50 cm spacing)			
			6 km/h	8 km/h	9 km/h	10 km/h
11001	275	0.38	30	22	20	18
110015	275	0.57	45	34	30	27
11002*	275	0.75	60	45	40	36

* Standard tips for 40 L/ac at 275 kPa and 9 km/h. For nozzles not included, refer to manufacturer's data.

Note: If spray charts are not available for your nozzles, the following formula may be used to establish the ground speed required to apply the desired litres per acre.

Formula:

Average nozzle output (L/min) x 240 = km/h

Litres per acre x nozzle spacing (m)*

* Standard nozzle spacing is 0.5 m.

Example:

$$\frac{0.75 \text{ L/min} \times 240}{40 \text{ L/ac} \times 0.5 \text{ m}} = \frac{180}{20} = 9 \text{ km/h}$$

Nozzle tip calibration

The output of individual nozzles must be within 5 per cent of the average nozzle output to provide an even volume over the width of the spray swath. Nozzles with outputs either above or below this value must be replaced.

- With the sprayer operating at the recommended spraying pressure (275 kPa), collect, measure and record the output from each nozzle on the boom for one minute. Note: if nozzle strainers are equipped with ball-check valves, increase pressure by 35 kPa.
- Calculate the average output.
- Replace nozzles with output 5 per cent greater than average. Clean and recheck nozzles with output 5 per cent less than average.

Ground speed determination

Actual ground speed can be confirmed by noting the time it takes to travel a measured distance. The following ground speed chart is based on the time required to travel 800 metres.

Speed (km/h)	Travel time for 800 m (min:sec)
7	6:48
8	6:00
9	5:20
10	4:48
11	4:22
12	4:00

Sprayer Calibration – Example L/Acre

Step 1: Determine the number of acres to spray using your field records.

Example: 30 acres

Step 2: Know the sprayer tank capacity, which is marked on sprayer tank.

Example: 2,000 litres

Step 3: Determine spray volume needed per acre, which can be obtained from the pesticide label or this publication.

Example: 40 litres per acre recommended

Step 4: Select nozzles for 40 litres per acre from the manufacturer's chart or the sample nozzle chart in this publication.

Example: Nozzle No. 11002 at 275 kPa and 9 km/h = 40 L/acre

Step 5: Check nozzle output. See nozzle tip calibration.

Example: Nozzle flow between 0.71 to 0.79 litres per minute per nozzle is okay

Step 6: Calculate total spray solution needed by multiplying number of acres x litres per acre.

Example: 30 acres x 40 litres per acre = 1,200 litres

Step 7: Calculate the total amount of pesticide needed from the pesticide label or this publication (multiply litres of pesticide per acre x number of acres to spray).

Example: 0.60 L/acre x 30 acres = 18 L of pesticide and 1,182 L of water in sprayer tank

Step 8: Set sprayer to travel at desired speed. See Step 4 (example) and nozzle chart.

Example: Required speed = 9 km/h (36 seconds to travel

Standard Benchmarks

Application volume: 40 litres per acre (L/ac) = 100 litres per hectare (L/ha) = 8.8 Imperial gallons per acre

Spraying pressure: 275 kilopascals (kPa) = 40 pounds per square inch (psi)

Speed for spraying: 9 kilometres per hour (km/h) = 5.4 miles per hour (mph)

Nozzle spacing on spray boom: 0.5 m = 20 inches (in.)

Height above target for 80° and 110°

Nozzle tips: 45 centimetres (cm) = 18 inches (in.)

Nozzle tips: 8002 or 11002

Note: A standard nozzle puts out 0.75 litres per minute at 275 kPa. At 9 km/h, these nozzles apply 40 L/ac of spray.

Metric equivalents

1 acre = 0.405 hectare

2.471 acre = 1 hectare

6.9 kPa = 1 psi

1.6 km/h = 1 mph

2.54 cm = 1 in

1 litre/ac = 2.5 litre/ha

Calibrating Small Sprayers

The spray volume that a backpack or hand-held sprayer will apply per acre can be determined by field testing the sprayer on a portion of an acre. The size of the test area commonly used is 1/100 of an acre. It is important that the test area surface is similar to the surface to be sprayed, so the walking speed will remain the same.

Step 1: Establish a test run distance to spray 1/100 acre (40.5 m₂) according to the swath width of the sprayer.

Swath width	Test run length
0.5 metres	81.0 metres
1.0 metres	40.5 metres
1.5 metres	27.0 metres
2.0 metres	20.2 metres

Step 2: At a comfortable walking speed, spray the test area and measure the volume of water used (repeat 2 or 3 times to obtain an average). This is the amount applied to 1/100 acre.

Example: 2 litres

Step 3: Multiply the figure arrived at in Step 2 by 100 to get the spray volume per acre.

Example: 2 L x 100 = 200 L/ac

Step 4: Determine the amount of pesticide to add per tank load. Divide the volume applied per acre by tank capacity to determine the number of fills required to spray an acre.

Example: 200 L/ac ÷ 20 L/tank = 10 fills

Divide the chemical rate per acre by the number of tank loads required to spray an acre to determine the amount of product to add per tank load.

Example: 1 L/ac ÷ 10 fills = 0.1 L/tank

Preparation and Application of Pesticides

Tank Mixtures

Tank mixtures are two or more separate pesticides mixed in the sprayer tank, as opposed to a mixture formulated by the manufacturer. Tank mixing is often done to reduce the number of applications of pesticide. Mixing a grassy herbicide with a broadleaf herbicide is one of the most common mixtures. Another reason for mixing herbicides is to include more than one mode of action on the weeds to combat the development of resistance in the target pest. Lately, there have been a lot of pesticide products put together as co-packs. That is when the tank mix partners are placed in individual containers in the same box.

Adjuvants (surfactants, wetting agents, spreaders, etc.)

Adjuvants are added to a pesticide to enhance application and/or performance. The most common adjuvants used in pesticides are surfactants. If adjuvants are required, use only those products

named and recommended on the label. Failure to do so could result in the following:

- crop injury
- reduced pest control
- invalidation of pesticide warranty

Surfactants facilitate and enhance the emulsifying, dispersing, wetting, spreading, sticking, penetrating or other surface-modifying properties of liquids to bring about enhanced pesticidal action. Because these chemicals produce physical changes at the surface of liquids, surfactants are often referred to as surface-active agents.

Surfactants are generally classified into two major groups based on how they react in water: ionic or non-ionic. Ionic surfactants break down into two entities when mixed in water, – a positively charged ion (cation) and negatively charged ion (anion). An example is ammonium sulphate ($2 \text{NH}_4^+ + \text{SO}_4^-$).

Non-ionic surfactants do not break down in water. Consequently, they are unaffected by hard water, can be used in strong acid solutions and are more soluble in cold water than in hot water. Some of the commonly recommended non-ionic surfactants for herbicide mixtures are Agral 90, LI 700, Ag-Surf, Companion, Citowett Plus, Enhance, Super Spreader, Tween 20.

Preparing a tank mix

To avoid physical incompatibilities, go through the following general steps or use the appropriate mixing instructions below:

- add half the required amount of water and mix with one pesticide
- agitate
- with agitator running, add the other pesticide. Add pesticides to the spray tank in the following order to reduce the possibility of formation of precipitates or gums that may clog nozzles and filters:
 - soluble powders
 - wettable powders and flowable liquids
 - solutions (amines and salts)
 - emulsifiable concentrates (esters)
 - additives (surfactants)

Specific Mixing Instructions

“a” Single product mixing instructions

1. Fill clean tank $\frac{1}{4}$ to $\frac{1}{2}$ full with clean water.
2. Turn on full agitation.
3. Add the proper amount of herbicide to the water in the spray tank with the agitator running. Maintain full agitation until completely dissolved and product is fully dispersed. Continuous agitation is required to keep the product in suspension.
4. After herbicide has been well mixed and is in suspension, add a recommended non-ionic surfactant, if required.
5. Add the remainder of the water.

On repeat tank loads, ensure that the amount of spray solution left in the tank from the previous load is less than 10% of the volume to be mixed.

“b”

1. Fill tank $\frac{1}{2}$ full of water.
2. Start sprayer agitation.
3. Add Group 2 herbicide and agitate vigorously, if a granule, agitate until dissolved.
4. Add tank mix partner herbicide and continue to agitate.
5. Add adjuvant if required and continue to agitate.
6. Add antifoaming agent if required and continue agitation.
7. Complete filling of the tank with the balance of the water.

“c”

1. Clean spray tank and $\frac{1}{2}$ fill with clean water. Start agitation or bypass system.
2. Add broadleaf herbicide to the tank first prior to adding grassy herbicide and agitate for 2 - 3 minutes.
3. Add correct amount of grassy herbicide.
4. Agitate for 2 - 3 minutes.
5. Add correct amount of adjuvant.
6. Agitate for 1 - 2 minutes before adding remainder of water.
7. After any break in spraying operations, agitate thoroughly before spraying again.
8. Use the spray suspension as soon as it is prepared.
9. If an oil film starts to build up in the tank, drain tank and then clean with a detergent.

“d”

1. Ensure the spray tank is thoroughly clean.
2. Fill the tank half full with clean water and start agitation or bypass system.
3. If a broadleaf herbicide is to be used with Fusion tank mix, add it first and agitate.
4. Slowly add the correct amount of **Component #1** to the spray tank. Agitate thoroughly until **Component #1** is mixed completely.
5. Add the correct amount of **Component #2** and continue agitation.
6. Triple rinse the emptied containers into the spray tank.
7. Add the remaining amount of water while agitation continues. Spray out immediately. Spray mixture should not be left in tank overnight.
8. Thoroughly clean the spray tank after using Fusion tank mix and before using any other pesticide.

"e"

1. Always start with a clean and empty sprayer tank.
2. Fill the tank 1/3 to 1/2 full of clean water.
3. With the agitator running, add the required amount of Express SG herbicide.
4. When Express SG herbicide has been thoroughly dissolved, add the required amount of the appropriate tank mix partner.
5. Add the glyphosate to the tank. If the tank mix partner is an emulsifiable concentrate (EC), reduce agitation to avoid inducing an invert emulsion. Once dissolved, Express SG will remain in solution.
6. Add the rest of the water.
7. If required for tank mixture, add surfactant.
8. Refer to the label for specific tank mixing order and directions.
9. For repeat tank loads, reduce the material remaining in the tank to 10% of the original volume or less before proceeding with Step 1 because remaining chemicals may prevent Express SG from completely dissolving. If it is not possible, pre-slurry Express SG herbicide in a small amount (5 - 10 L) of water before adding to the tank.
10. If an anti-foaming agent is required, add last.

Avoid tank mix problems

Check the labels for recommended crops, pests and rates for tank mixes as they may be restricted compared to the recommendations for each individual product. For example, either Poast or MCPA Amine alone can be used on several crops. A Poast + MCPA Amine tank mix can only be used on flax.

Crop injury, reduced pest control or physical incompatibilities may be the result of using tank mixes improperly. When herbicides for grassy weed control are mixed with herbicides for broadleaf weed control, a partial loss (sometimes total loss) of activity on grassy weed control is quite common. When reduced weed control or crop injury is likely to occur, the advantages of tank mixing are quickly lost.

- Tank mix properties are not necessarily the same as those of the individual pesticides applied separately.
- Use registered tank mixes only.
- Check the labels for recommended crops, pests, rates and adjuvants for tank mixing.

- Follow label directions for preparing the mix.
- Use only on crops or varieties registered for the particular tank mix.
- Apply at the recommended stage of growth or development of crop and pest(s).

Sprayer Clean-out

Modern pesticides can affect susceptible crops at very low concentrations. Proper sprayer cleaning is a critical component for the maintenance of the sprayer, reducing water contamination risks and eliminating crop injury from equipment contamination.

Herbicide residue adheres to tank walls and crevices and may be brought into solution by a subsequent herbicide or a particularly effective spray adjuvant acting as a solvent. Plastic or polyethylene tanks and hoses tend to require more extensive cleaning than stainless steel tanks. Post-emergent application sprayed directly on crop foliage will have a greater potential for crop injury than soil-applied herbicide. Crop injury from sprayer contamination can occur even several months after using the sprayer without proper cleanup, and injury can occur even following several subsequent applications.

Water is needed for dilution. The more often a sprayer is rinsed out, the greater the dilution of chemical left. You have a greater dilution by repeatedly rinsing the tank with small quantities of water rather than one rinse with a large volume of water. Water is adequate to flush and rinse the sprayer with some herbicides, but others need additional cleaning agents. The additional cleaning agents needed for cleaning will depend on the herbicides used. There are common household chemicals that can be used, but most producers use commercial sprayer cleaning products. Sprayer cleaning agents can have several functions including dilution, solubilization and/or de-activation.

Cleaning agents can increase the solubility of a herbicide. Ammonium increases the pH of the solution, which increases the solubility of sulfonylurea herbicides. The agent may not help break down the herbicide, but it does help strip the herbicide off the tank surfaces and get it into solution. Chlorine bleach enhances the decomposition of sulfonylurea and many other herbicides, but it is **less** effective than ammonia at dissolving and removing sulfonylurea from the tank.

Chlorine bleach should never be added to ammonium or liquid fertilizer containing ammonium as, when mixed together, the two materials react to form toxic chlorine gas, causing eye, nose, throat and lung irritation.

Oil-based solvents such as fuel oil are most effective for removing oil-soluble herbicides, such as esters and emulsifiable concentrates. The oil solvent should be followed with a detergent rinse to remove the oil residue.

Detergents remove many materials including water and oil-soluble herbicides. Commercially available sprayer cleaning agents normally perform better than household detergents for cleaning sprayers.

The best source of information on cleaning agents and procedures is the herbicide label for the product used.

Activated charcoal de-activates organic herbicides.

A 3 per cent suspension of activated charcoal in water can be added and circulated throughout the sprayer system to tie up and de-activate any pesticide residue. The charcoal must be removed by rinsing to prevent the de-activation of a portion of the pesticide used in the sprayer.

Sprayers should be cleaned as soon as possible after use. Dried pesticide residues are much more difficult to remove than pesticide in solution. Reduce waste and excess application by only mixing the amount of pesticide required, and apply the entire amount on the field according to the label recommendations. Thoroughly rinse the sprayer tank with water, circulate the water through the sprayer system and, if possible, apply the rinsate to the treated field.

Do not clean sprayers near creeks, dugouts, sloughs, wells or any other water sources. Ensure that wash water does not come into contact with any desirable vegetation or its roots. Make sure discharged wash water (especially from insecticides) will not be accessible to children or animals. Do not contaminate any watercourse or water body with wash water.

Note: Pesticides may have specific recommendations for sprayer clean-out. Refer to product labels on the container for recommendations.

There are three main methods for sprayer tank clean-out depending on the pesticide used.

Method A

Drain contents of tank followed by 1 or 2 water rinses, 2 ammonia rinses (**NOT containing chlorine**) followed by 2 water rinses (one just prior to next sprayer event). Products that can use this cleanup method include 2,4-D, Accent, Ally, Atrazine, Avadex, dicamba, dichlorprop + 2,4-D, DyVel, Escort, Everest, Express Pack, FlaxMax, Fusion, Harmony Total, MCPA, Muster, Muster Gold, Poast Ultra, Prism, Pursuit Ultra, Refine, Refine M, Rustler, Sundance, Tordon 22K.

Method B

Drain contents of tank followed by 2 water rinses, 2 detergent rinses, then 2 more water rinses. Products you use this method for include Axial, Liquid Achieve SC*, Achieve Liquid Gold*, Basagran, Bromoxynil + MCPA, clethodim, Gramoxone*, Liberty, Puma¹²⁰ Super, Reglone Dessicant*, Reward*, Sencor, trifluralin products, Venture L*.

*Manufacturers of these products recommend adding a non-ionic surfactant such as All Clear, Agral 90 or Agsurf at 0.6 L per 100 L water.

Method C

Drain contents of tank followed by several repetitions of the water rinse with nozzles and screens removed and checked for debris. Products that can use this method are Amitrol 240, Assure II, Attain, Dual II Magnum, Eclipse, glyphosate products, Horizon, Horizon BTM, Lontrel, Odyssey, Prestige, Solo.

The above directions are general processes based on similarities of tank cleaning recommendations between products in each of the herbicide groups. Always follow the specific instructions on the product label. Follow these guidelines if label recommendations don't cover tank cleanup.

Products that are water based can usually be cleaned from the spray tank using Method C. Products formulated as an EC (emulsifiable concentrate), SC (soluble concentrate), or F (flowable) or use a petroleum-based adjuvant should at least use Method B. The detergent breaks down the oil that may be sticking to the sides of the tank. Most Group 2 herbicides have tank clean-out recommendations, but those that do not should use Method A for tank clean-out. If there is a tank mix of different pesticides, use the appropriate combination of methods to clean the tank.

Group 2 herbicides will occasionally get trapped on the tank wall by petroleum-based formulations or adjuvants, resulting in tank residues. Add detergent at 0.25 L/100 L to the ammonia rinse to prevent this situation from happening. The detergent breaks down the petroleum coating to allow the ammonia access to the Group 2 product.

What to Do if Results Are Unsatisfactory

- Ensure the choice of pesticide(s) was suitable. Are the treated crops and pests listed on the product label(s)?
- Compare your method of pesticide preparation to the product label(s) instructions.
- Check for equipment malfunction – e.g. plugged screens, nozzles worn or mixed type or size.
- Compare your application techniques with those given on label(s) – e.g. stage of growth or development of crop and pest(s), ground speed, pressure and incorporation.
- Consider weather conditions at application time – several labels include cautions against application during weather extremes – e.g. cold, heat, drought.
- Consider time since application. Some results are not apparent for several days. Look for early symptoms of the chemical taking effect.
- If results are unsatisfactory, seek technical help. Gather all relevant data, particularly evidence such as photos or specimens. Record wind, rainfall, soil moisture condition, crop variety, fertility, quantity of material used, acres treated and temperature at time of spraying.
- Document everything in writing. If crop damage is involved, submit a specimen for diagnosis. Disease or insect damage can resemble herbicide injury.

Pesticides and the Environment

Responding to a Pesticide Related Concern

The *Environmental Protection and Enhancement Act* prohibits any person from causing adverse effects when using pesticides. Farmers who witness or suspect a pesticide drift or runoff that could affect their family, pets or livestock or cause an adverse effect to their shelterbelt, crop or their land should take the following actions to protect themselves and assist in an investigation that may result at a later date:

- Immediately request family members to go into the home to protect themselves from exposure. Close all windows and air conditioning units in the home. If they have felt spray settle on them, they should immediately remove clothing and wash exposed skin. If any physical symptoms develop, then they should seek medical assistance or call the Poison Centre at 1-800-332-1414.
- Pets should be removed from the immediate spray area or area where drift has occurred.
- If livestock are at risk, the applicator should be asked to stop the application until the livestock can be removed or conditions change so the wind is blowing away from the livestock.
- If drift has occurred in the farmyard, then outdoor furniture and play equipment should be washed before use and garden produce, berry and fruit trees should not be harvested or consumed but should be monitored for unusual growth or discoloration. If the produce shows signs of damage, it should be destroyed. If berries or fruit trees show signs of damage, the berries or fruit should not be eaten. If no signs of damage occur after one to two weeks (depending on the pesticide), then all produce, berries and fruit should be washed thoroughly.
- Record as much detail of the application equipment (colour and type of spray equipment; make, model, licence plate number, company information off nurse trucks; colour, distinguishing features, call numbers on the aircraft). If possible, take pictures.
- Write down everything regarding what was witnessed including date and time of occurrence, weather

conditions at the time, crop being sprayed, pesticide being applied (from pesticide containers at the site), extent of drift witnessed, description of person helping or doing the application, other witnesses.

- Attempt to contact the adjacent landowner and indicate your concerns.
- Contact the Alberta Environmental Response Centre at 1-800-222-6514 **promptly** for information and assistance in investigating the concern. Some pesticides degrade quickly, so prompt investigative action is required to proceed with enforcement action.

Pesticide Residues Found in Alberta Water Sources

A long-term study of water sheds in the province recently concluded. The Alberta Environmentally Sustainable Agriculture (AESAs) Stream Survey was initiated in 1999 and continued until 2006. It tested the water quality in 23 watersheds throughout the agricultural areas of the province several times each year to get information on the presence and distribution of 68 possible pesticide residues in the water. Four of the watersheds received irrigation return flows and the rest were dryland.

Results show pesticide residues were commonly found in the water samples. Keep in mind that testing processes are able to detect very small amounts of chemical, far below any observable effect. Maximum pesticide concentrations were typically found in spring and during summer pesticide applications. Concentrations of detected pesticides occasionally exceeded existing water quality guidelines for either the protection of aquatic life or irrigation use.

This study highlights the importance of using due care and attention when applying pesticides as they do not necessarily remain where they are applied. Use integrated pest management strategies to improve the impact of applied pesticides and established benchmarks for the use of registered pesticides. The Farmer Pesticide Certificate program is an excellent example of training for the when, where and how to use pesticides.

For more information on the results or for a full version of the study, check Alberta Agriculture's website at [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/irr12914](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/irr12914)

Pesticide Applicator Certificate

Anyone applying pesticides (herbicides, insecticides, fungicides or rodenticides) on property not owned, rented or leased by them or in exchange for a fee must hold a Pesticide Applicator Certificate (issued by Lakeland College) and a Pesticide Service Registration (issued by Alberta Environment). If someone is offering to spray your property, ask to see a Pesticide Service Registration and a Pesticide Applicator Certificate (all applicators are issued wallet-sized identification cards).

For questions pertaining to pesticide applicator certification, please call Lakeland College at 1-866-853-8646. For questions pertaining to service registrations, contact the nearest regional office of Alberta Environment.

Please remember that a certificate is not a guarantee of performance. A certificate only certifies that the certificate holder has met a minimum standard of knowledge; it cannot assess an applicator's integrity or the honesty of his business practices. If you are uncertain about the reliability of a particular applicator, ask for references.

Farmer Certification Requirements

Pesticide manufacturers and the federal Pest Management Regulatory Agency (PMRA), in consultation with provincial agriculture and environment departments across Canada, have agreed that some pesticides have higher toxicity and/or greater potential to adversely affect health or the environment and require producers to obtain further knowledge to purchase and use them. This means, producers must take a course and pass an exam verifying that they have the knowledge to safely and effectively manage and apply these pesticides when applying them on their own property. Currently, pesticides containing the active ingredient aluminum phosphide require mandatory certification for producers to purchase and use. Aluminum phosphide is used to treat stored grain pests and for rodent control in the field.

Producers are encouraged to consider obtaining Farmer Pesticide Certification. The course contains detailed grain fumigation and rodent management information that can assist in preventing outbreaks and managing them more effectively when they occur. The Environmental Farm Plan further encourages producers to learn more information about safe and effective

handling, use, application, storage, transportation and disposal of pesticides. The Farmer Pesticide Certificate course has been developed for producers and meets the Standard for Pesticide Education, Training and Certification in Canada. Not only does it provide producers with essential information, it also provides evidence to the public, who consume their product, that producers hold current knowledge required to safely and effectively apply pesticides.

Producers can obtain the Farmer Pesticide Certificate course material from the following sources:

- online at: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/prm12233](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/prm12233)

The Ag-Info Centre can also provide producers with information regarding in-class sessions that can be taken throughout Alberta and how and where producers can write the certification examination.

Note: The Farmer Pesticide Certificate does not qualify a producer to apply pesticides for other farmers or for a fee. Producers wanting to provide any pesticide application service off their own property must obtain a Pesticide Applicator Certificate. The training materials and examinations for this certificate are offered through Lakeland College at 1-866-853-8646.

Pesticide User Responsibility

Pesticide drift

Pesticide drift is a concern for ground as well as aerial application. Landowners are responsible for ensuring that any pesticide applications conducted on their property are conducted in a safe, responsible manner.

- The choice of chemical should be made with adjacent land uses in mind. If neighbours have livestock, bees, shelterbelts and gardens that may be affected by off-target drift, they should be notified prior to application. Perhaps a different chemical, formulation or application method will provide the same control and greater compatibility with neighbouring land uses.
- All sprayers (ground or air) should be calibrated prior to use, taking into consideration nozzle type, nozzle pressure and boom height. Calibration will assure better performance as well as reducing the risk of chemical drift. The use of spray shrouds or wind protection on the sprayer are also useful tools to prevent spray drift. If you are hiring a custom

applicator (ground or air), be sure to ask when the equipment was last calibrated, and be sure to check during the application to see whether any visible drift is occurring.

- Some adjuvants or stickers can help reduce spray drift.
- Buffer strips should be left when applying pesticides next to sensitive crops, watersheds and farmsteads. The size of these strips may be specified on the pesticide label, but if not, then the size will depend on the chemical used, the application method and the degree of risk from escaping drift. Pesticide applications conducted near rivers, creeks, lakes, irrigation canals or other open bodies of water require extra care and caution to ensure water users will not be affected by the proposed pesticide application and that the application is conducted in a manner that will not adversely affect aquatic or riparian habitats. Ideally, natural vegetation should be left along natural water bodies to ensure bank stability and to provide a natural buffer and filter for agricultural chemicals. A Special Use Approval must be obtained from Alberta Environment to perform pesticide applications within 30 metres of an open body of water when the adjacent land is unimproved rangeland, pasture or woodlot. Certified applicators applying pesticides within 30 metres of an open body of water do not require a Special Use Approval as long as the pesticide they are using is identified in the Environmental Code of Practice for pesticides and they are following the conditions of application specified in the code.
- Pesticides should not be sprayed when winds are excessive (generally winds over 16 km/hr are considered a drift hazard). Pesticides should only be sprayed when winds are blowing away from farmsteads, sensitive crops or water bodies. Conditions of "dead-calm" or temperature inversions or gusting should also be avoided to prevent vapour clouds. A suitable drift retardant additive to the spray tank may help reduce the potential drift hazard associated with the spraying of pesticides.
- Appropriate nozzles that produce a good droplet size range and minimize the production of fine droplets are an important drift management tool.
- Always assess the risk to adjacent landowners, and never push weather conditions to meet deadlines. If completing an application as planned may mean damaging your neighbour's property, postpone the application or modify it to prevent off-target damage. Landowners can be held liable for pesticide

drift even if a custom applicator was hired to perform the application. When you hire a custom applicator, it is important that you hire a company that is registered, operates with certified applicators and has the knowledge, equipment, experience and desire to perform an application properly. Custom applicators must be aware of neighbouring residences and sensitive crops, (including gardens, livestock, bees, shelterbelts and gardens) that could present problems if drift should occur.

- All pesticide users, commercial pesticide applicators and farmers are legally responsible for safe pesticide use. Farmers who cause damage from their pesticide application activities or who counsel a commercial pesticide service to conduct either an illegal pesticide application or an application under questionable circumstances (e.g. extremely windy conditions) that results in damage, can be held liable for compensation and face potential prosecution. **Farmers are cautioned** not to counsel commercial applicators to apply pesticides not registered for the use intended or to direct applications to occur under known circumstances that could cause damage (such as under windy conditions). Results of such actions could cost you time and money by having to appear in court to answer to charges or through the subsequent remediation of damaged crops, shelterbelts, gardens, etc.

Notification of neighbours before applying pesticides

It is strongly recommended that you notify your neighbours prior to spraying or having your crop sprayed, particularly if your fields border your neighbours farmstead or other sensitive areas (e.g. where beehives, gardens or shelterbelts may be located). Many potentially harmful situations can be avoided if you talk to your neighbour and advise what and when you anticipate spraying. Let them know whether you will be spraying by ground or by air (noise from low flying aircraft has been known to cause panic in livestock), and ask if your neighbour is planning any events (e.g. family reunions/picnics) where larger numbers of people may be gathered and could potentially be exposed to pesticides from your application. By notifying your neighbours, you are not seeking their consent, but rather letting them know you are concerned about them and their property and want them to be able to take whatever action they believe is necessary before spraying to reduce the potential exposure to the pesticide.

Disposal of pesticide treated seed

Seed treated with a fungicide, fungicide mixture or fungicide/insecticide combination can be very toxic and should be treated with respect. A blue or red colouration on seed indicates it is pesticide-treated. Extra care must be taken during the transport and disposal of pesticide treated seed to prevent domestic animals, birds and other wildlife from consuming the treated seed.

Spillage

To prevent treated seed spillage, move treated seed, in labelled, marked bags. Open container transport is not recommended. Bags should be checked for damage, and containers should be sealed or lined with plastic or other suitable material. Truckloads of seed should be tarped down securely to avoid any possible highway spillage. Treated seed blowing off along the road can kill many birds. All treated seed and seed treatment residue should be placed into the seeder at planting time – never dumped in a field. Never leave surplus treated seed unburied. Spills of treated seed, such as from trucks lurching, can be enough to kill deer or cattle. Any spilt seed should be buried. Incorporate granular pesticides immediately after application to prevent birds and other wildlife from consuming them.

Disposal

Normally, treated seed is planted within one or two years of treatment. If there is treated seed, either bagged or loose that is either considered too old or too low in germination, then consider its disposal. Such treated seed should be mixed with new seed and planted at higher rates or seeded by itself. For example "old canola seed" can be mixed and sown with new canola seed or overseed alone along field margins or low areas. If disposal is necessary, check with your local landfill authority before disposing in a sanitary landfill. Ensure that the treated seed is covered immediately after dumping.

Pesticide disposal

Unwanted or out-of-date pesticides should be disposed of very safely and responsibly. Pesticides are hazardous wastes and cannot be disposed of in sanitary landfills or by burning. If you will not be able to use pesticide supplies, check to see whether a neighbour may have some use for them. Pesticides that have no further use must be disposed of through a qualified (approved) hazardous waste disposal firm. Names of companies that are licenced to handle hazardous waste can be obtained by contacting

the Alberta Recycle Information Line toll-free at 1-800-463-6326 or in Edmonton at 780-427-6982.

Water protection

The preservation of surface water is critical to our sustained quality of life and agricultural production. Surface water throughout Alberta has been monitored for a number of years. Monitoring data collected over a seven-year period indicated that 98 per cent of over 3,000 samples contained at least one pesticide active ingredient. The majority of the pesticides found in surface water are shown to have originated from either agricultural or urban areas. Farmers must take the necessary steps to prevent pesticides from continuing to enter surface water. Pesticides can be carried to a water body in three ways:

- spray drift from application equipment
- water runoff from farmland
- attached to soil and carried by wind

The greatest protection of surface water occurs by maintaining vegetation (trees, shrubs and grasses) surrounding small streams, rivers and lakes. This riparian vegetation acts as a filter to protect surface waters. Where the riparian vegetation no longer exists, grass buffers should be left next to water to help filter the runoff from agricultural land. Additional protective actions can also assist in protecting water:

- Pesticide must **not** be stored or mixed or application equipment cleaned within 30 metres of any water body and water sources including wells and dugouts.
- Pesticides subject to leaching should not be used on coarse-textured soils (i.e. sandy or gravelly) to prevent groundwater contamination.
- Never store pesticides in well houses.
- Haul water to your sprayer and fill it in the field rather than taking the sprayer near the water source.
- Do not leave sprayers unattended while filling.
- Empty pesticide containers should be never be left near a water body.
- Where possible, spray when wind is blowing away from the water body.
- Have an emergency pesticide spill kit available when mixing pesticides.

Pesticide container disposal

Triple rinsing or pressure rinsing of pesticide containers is the recommended method of cleaning pesticide containers prior to disposal. Triple rinsing

renders used pesticide containers (metal, plastic, glass) more than 99 per cent free (less than 1 ppm) of residues in most cases. There are a number of systems for pressure rinsing. The simpler style consists of a hollow spike connected to a water line, which injects water under pressure into the jug, which is then drained into the spray tank. A newer style consists of a small hopper mounted right on the sprayer with a sharp metal jug opener and a pressure rinse nozzle in the bottom of the hopper. The full jug is inserted on the jug opener, which drains the chemical into the tank. Wash water is injected under pressure to rinse the container. The chemical and rinse solution is then pumped into the spray tank by direct hose connections.

Unrinsed containers have the potential to contaminate soil, ground water and surface water, and can be toxic to fish and wildlife. Unrinsed containers impede the processing and recycling of empty pesticide containers, as containers have to be emptied, and workers are exposed to the residue. Residues can be transported to the atmosphere during storage, processing, shipping and energy recovery, or they can contaminate end products from plastic recycling processes. In addition, it is estimated that 6 to 7 per cent of product can be left in unrinsed containers. This amount of material can treat 1/2 to 1 acre of land and can result in several dollars of savings.

It is the responsibility of the farming community to ensure that their empty pesticide containers are directed to a designated collection site, whether it is a municipal site or back to the point of purchase (depending on the product and size of container). Please determine the correct disposal site at the time of purchase.

Containers disposed of at a container collection site are to be clean (triple rinsed or pressured rinsed) and well drained (dry). Paper bags and cardboard containers that contained pesticides should be thoroughly emptied and disposed of at a sanitary landfill. **Do not burn paper bags or cardboard containers.**

Under the Alberta *Environmental Protection and Enhancement Act*, non-refillable plastic or metal pesticide containers (restricted, agricultural and industrial products) must be disposed of at a pesticide container collection site.

Outer packaging (cardboard box) and paper booklets (affixed to plastic containers) can be disposed of in a regular landfill, or they can be recycled if non-

contaminated. The presence of the paper attached to the containers that are to be recycled impairs the quality of the plastic, which will be used for other end products. Some pesticide container sites have bins or separate areas for collecting outer packaging and label materials.

Steps to follow for manual triple rinsing

(without using a pressure rinse system):

- Empty contents of the container into the spray tank and drain in a vertical position for 30 seconds.
- Add water to container to about 1/5 full.
- Shake the container thoroughly and empty into the spray tank, and drain for 30 seconds.
- Repeat the procedure two more times; it should only take about 5 minutes in total.
- Triple rinsed containers should be punctured or broken to render them non-reusable. Punctured containers also identify themselves as being triple rinsed. **Note:** Do not puncture unrinsed containers – pesticide from unrinsed containers is concentrated material, and puncturing unrinsed containers will cause them to leak and create exposure of the concentrated material to the environment and to persons handling the containers.
- Dispose of all plastic and metal containers at a pesticide container collection site (see list).

Pesticide spill cleanup

The best way to minimize the effects of a pesticide spill is to have an emergency response plan prepared and in place that includes a copy of the Material Safety Data Sheet (MSDS) and a procedure to handle all types of pesticide emergency. In addition, a spill cleanup kit should be prepared and be available near the pesticide storage site and at the mixing and loading site. A spill cleanup kit should include the following:

- personal protective equipment (see the Protective Clothing and Equipment section)
- absorbent material such as activated charcoal, vermiculite, dry coarse clay, kitty litter or commercial absorbent
- neutralizing material as indicated on the MSDS
- long-handled broom for dry formulations
- shovel for liquid formulations
- waste-receiving container with a lid
- blank labels to identify contents of waste container

In the event of a pesticide spill, follow the steps listed below:

- Isolate affected area.
- Put on protective clothing and equipment.
- Ventilate the area (if indoors). For outdoor spills, work from the upwind side of the spill.
- If possible, stop the containers from further leaking.
- Contain the spread of the spill using soil, sand bags, vermiculite, kitty litter, etc. to provide a barrier to the spread of the spill. Prevent pesticide entry into sewers or water supply.
- Report the spill immediately (if into or threatening a watercourse or if the pesticide is or will cause an adverse effect off your property).
- Clean up the spilled pesticide. Absorb spill on paper, sand, dirt or other inert material (e.g. kitty litter).
- Decontaminate the spill area by washing the site with detergent or other cleaning products such as ammonia. Check the product label MSDS (material safety data sheets) or contact the manufacturer for advice on cleanup procedures (most products have a 1-800 customer service number on the label) and disposal. If the spill is large, evacuate the area and notify safety personnel.

Emergencies or spills must be reported to the 24 hour Alberta Environmental Response Centre: 1-800-222-6514.



The CleanFarms initiative offers a free empty pesticide container recycling program. The program requires pesticide containers to be pressure rinsed or triple rinsed; paper booklets must be removed, and the clean, empty containers can be returned to a pesticide container site (see following pages). For more information, contact your local collection site or visit www.croplife.ca

Pesticide Container Site Locations

Municipality	Site	Legal land location	Contact
Acadia, MD of	Acadia Valley Landfill	NW7-25-1-W4	Rick Niwa 403-972-3808
Athabasca, County of	Colinton Waste Transfer Station	NE7-65-22-W4	Ron Jackson 780-675-2273
Barrhead, County of	Barrhead Landfill	SW3-60-4-W5	Marilyn Flock 780-674-3331
Beaver County	Ryley Regional Landfill	NE10-50-17-W4	Aimee Boese 780-663-3730
Beaver County	Viking Waste Transfer Station	NE31-47-12-W4	Aimee Boese 780-663-3730
Big Lakes, MD of	High Prairie Regional Landfill	NW9-73-15-W5	Amada Nepsted 780-523-5955
Birch Hills County	Wanham Landfill	SW13-78-3-W6	Warren Sekulic 780-694-3793
Birch Hills County	Tangent Landfill	NE36-78-25-W5	Warren Sekulic 780-694-3793
Bonnyville, MD of	Bonnyville Seed Cleaning Plant	NW18-61-5-W4	Matt Janz 780-826-3951
Bonnyville, MD of	Goodridge Landfill	SW4-63-9-W4	Matt Janz 780-826-3951
Brazeau County	Drayton Valley – Brazeau Reg. Landfill	SE20-49-7-W5	Rick Ennis 780-542-7777
Calgary, City of	Calgary – Forest Lawn Landfill (includes MD #44)	3801-68 St. S.E. Calgary	Corey Colbran 403-230-6634
Camrose, County of	Camrose Regional Landfill	NE16-46-20-W4	Paul King 780-672-4765
Camrose, County of	Ferintosh – West Dried Meat Lake Landfill Authority	SW14-44-21-W4	Paul King 780-672-4765
Cardston County	Spring Coulee Waste Transfer Station	SW32-4-23-W4	Rod Foggini 403-653-4977
Clear Hills, MD of	Worsley Landfill	SE25-87-8-W6	Aaron Zylstra 780-685-3925
Clearwater County	Rocky Mountain House Waste Transfer Station	SE2-39-5-W5	Kim Nielsen 403-845-4444
Cypress County	Irvine Waste Transfer Station	NE31-11-2-W4	Jason Storch 403-526-2888
Cypress County	Medicine Hat – Lakeside Milling	NE21-12-6-W4	Jason Storch 403-526-2888
Cypress County	Schuler Waste Transfer Station	SE20-16-1-W4	Jason Storch 403-526-2888
Drumheller, Town of	Drumheller Regional Landfill.	2490 South Railway Ave	Tammi Nygaard 403-832-1345
Edmonton, City of	Edmonton – Clover Bar Landfill	SW28-53-23-W4	Rick Lewin 780-496-5411
Fairview, MD of	Fairview Landfill	SW27-82-3-W6	Fred Sawchuk 780-835-4903
Flagstaff County	Sedgewick – Flagstaff Reg. Landfill	SW11-45-12-W4	Martin Dean 780-384-3950
Foothills, MD of	Okotoks – Foothills Reg. Landfill	SE32-19-29-W4	Ron Stead 403-652-2423
Forty Mile, County of	Bow Island Landfill	SE23-11-11-W4	Dave Matz 403-867-3530
Forty Mile, County of	Foremost Waste Transfer Station	NW19-6-11-W4	Dave Matz 403-867-3530
Grande Prairie, County of	Clairmont Landfill	NW27-72-6-W6	Sonya Raven 780-513-3955
Grande Prairie, County of	West County Regional Landfill	S1/2-22-73-9-W6	Sonya Raven 780-513-3955
Greenview, MD of	Valleyview – MD Yard	NW10-70-22-W5	Susan Kerekanich 780-524-7601
Kneehill County	Three Hills Waste Transfer Station	SW25-31-24-W4	Bruce Sommerville 403-443-5541
Lac La Biche County	Lac La Biche Landfill	NW36-66-13-W4	Kyle Beniuk 780-623-1747
Lac Ste. Anne County	Gunn – Lac Ste. Anne Reg. Landfill	NE18-55-3-W5	Geoff Thompson 780-785-3411
Lacombe County	Eckville Waste Transfer Station	NW34-39-3 W5	Dion Burlock 403-782-6601

Municipality	Site	Legal land location	Contact
Lacombe County	Mirror-Alix Waste Transfer Station	NW24-40-23-W4	Dion Burlock 403-782-6601
Lacombe County	Prentiss Waste Transfer Station	NW7-40-25-W4	Dion Burlock 403-782-6601
Lamont County	Lamont Regional Landfill	NW7-56-18-W4	Terry Eleniak 780-895-2585
Leduc County	Nisku Sewage Transfer Station	SW31-50-24-W4	Garett Broadbent 780-955-3555
Leduc County	Thorsby – County Yard	SE17-49-1-W5	Garett Broadbent 780-955-3555
Lesser Slave River, MD of	Flatbush Waste Transfer Station	NW36-65-2-W5	Russ Jassman 780-681-3929
Lethbridge, County of	Coaldale Waste Transfer Station	SW23-9-20-W4	Don Bodnar 403-328-5525
Lethbridge, County of	Iron Springs Waste Transfer Station	SW27-11-20-W4	Don Bodnar 403-328-5525
Lethbridge, County of	Nobleford Waste Transfer Station	SE10-11-23-W4	Don Bodnar 403-328-5525
Lethbridge, County of	Picture Butte Waste Transfer Station	NW27-10-21-W4	Don Bodnar 403-328-5525
MacKenzie, MD of	High Level Regional Landfill	SE1-110-20-W5	Grant Smith 780-927-3717
Minburn, County of	Vegreville Landfill	NW21-52-14-W4	Darwin Ullery 780-632-4033
Mountain View County	Didsbury – (near airport)	SW5-32-1-W5	Jeff Holmes 403-335-3311
Newell County of	Newell Regional Landfill	SE34-19-15-W4	Ray Juska 403-362-9567, 362-2651
Newell, County of	Bassano Waste Transfer Station	NE18-21-18-W4	Ray Juska 403-362-9567, 362-2651
Northern Lights, MD of	Dixonville – Long Lake Reg. Landfill	NW3-86-24-W5	Terry Schamehorn 780-836-3348
Northern Sunrise County	Nampa Waste Transfer Station	E19-81-20-W5	Audrey Gall 780-322-3831
Northern Sunrise County	St. Isidore Landfill	SW2-84-20-W5	Audrey Gall 780-322-3831
Paintearth, County of	Castor Waste Transfer Station	SW3-38-14-W4	Jeff Cosens 403-882-3211
Paintearth, County of	Coronation (Paintearth Resource Recovery Centre)	NE34-36-11-W4	Jeff Cosens 403-882-3211
Parkland County	Stony Plain Landfill	SE35-52-1-W5	Mark Cardinal 780-968-8467
Parkland County	Tomahawk-County Yard	SW13-51-5-W5	Mark Cardinal 780-968-8467
Peace, MD of	Griffin Creek Landfill	SW18-81-25-W5	Torsten Gevenich 780-338-3845
Pincher Creek, MD of	Cowley Regional Landfill	NW8-7-1-W5	Alan Jacklin 403-627-4151
Pincher Creek, MD of	Pincher Station	SW1-7-30-W4	Alan Jacklin 403-627-4151
Ponoka County	Bluffton Landfill	NE6-44-2-W5	Shayne Steffen 403-783-3333
Ponoka County	Ponoka Waste Transfer Station	NE36-42-25-W4	Shayne Steffen 403-783-3333
Provost, MD of	Provost Regional Landfill	SW3-40-3-W4	Burt Forbes 780-753-2368
Red Deer County	Horn Hill Waste Transfer Station	NE33-36-27-W4	Art Preachuk 403-350-2163
Rocky View, MD of	Bragg Creek Transfer Station	NE13-23-5-W4	Tim Dietzler 403-520-1271
Rocky View, MD of	Langdon Transfer Station	505 Railway Ave East	Tim Dietzler 403-520-1271
Rocky View, MD of	Irricana Transfer Station	SW28-27-26-W4	Tim Dietzler 403-520-1271
Saddle Hills County	Blueberry Waste Transfer Station	SE3-80-8-W6	Vacant 780-864-2004
Smoky Lake County	Smoky Lake Landfill	NW2-60-17-W4	Scott Franchuk 780-656-3730
Smoky River, MD of	Falher Landfill	NW15-78-21-W5	Norman Boulet 780-837-2222
Special Area #2	Bindloss Waste Transfer Station	SE24-22-3-W4	George Aaserud 403-854-5628
Special Area #2	Hanna Waste Transfer Station	NW16-31-14-W4	George Aaserud 403-854-5628

Municipality	Site	Legal land location	Contact
Special Area #3	Oyen Waste Transfer Station	LSD3-27-27-4-W4	Trent Caskey 403-664-3618
Special Area #3	Youngstown – Big Country Regional Landfill	SE29-29-9-W4	Trent Caskey 403-664-3618
Special Area #4	Monitor Waste Transfer Station	NW32-34-4-W4	Ryan Buehler 403-577-3523
Spirit River, MD of	MD of Spirit River Landfill	SW31-77-5-W6	Kelly Hudson 780-864-3500
St. Paul, County of	Mallaig Waste Transfer Station	NE24-60-10-W4	Dennis Bergheim 780-645-3301
St. Paul, County of	St. Paul Seed Cleaning Plant	SE16-58-9-W4	Dennis Bergheim 780-645-3301
Starland County	Rumsey Waste Transfer Station	SW24-33-21-W4	Alan Hampton 403-772-3793
Starland County	Michichi Waste Transfer Station	NW19-30-18-W4	Alan Hampton 403-772-3793
Stettler, County of	Stettler Regional Landfill	NW22-40-19-W4	Cara Bomphray 403-742-4441
Strathcona County	Fort Sask. Recycling Station	11121-88 Ave. Ft. Sask.	David Churchill 780-417-7130
Sturgeon County	Sturgeon Regional Landfill (Roseridge Waste Mgmt)	SW36-55-25-W4	Susan Berry 780-939-5678
Taber, MD of	Enchant Waste Transfer Station	NW16-14-18-W4	Jon Hood 403-223-8735
Taber, MD of	Grassy Lake Waste Transfer Station	NW23-9-13-W4	Jon Hood 403-223-8735
Taber, MD of	Taber Waste Transfer Station	SE12-10-17-W4	Jon Hood (403)223-8735
Taber, MD of	Vauxhall Waste Transfer Station	SW12-13-16-W4	Jon Hood (403)223-8735
Thorhild, County of	Thorhild	NE5-60-21-W4	Clarence Dowha 780-398-3741
Two Hills, County of	Two Hills Regional Landfill	NE5-55-11-W4	Al Ropchan 780-657-3358
Two Hills, County of	Willingdon Seed Cleaning Plant	NE1-56-15-W4	Al Ropchan 780-657-3358
Vermilion River, County of	Marwayne Waste Transfer Station	SE34-52-3-W4	Howie Bjorge 780-846-2244
Vermilion River, County of	Paradise Valley Waste Transfer Station	SW7-47-2-W4	Howie Bjorge 780-846-2244
Vermilion River, County of	Vermilion Transfer Station	SW5-51-6-W4	Howie Bjorge 780-846-2244
Vulcan County	Mossleigh Transfer Station	NW14-20-25-W4	Dick Ellis 403-485-2241
Vulcan County	Vulcan Waste Transfer Station	SW4-17-24-W4	Dick Ellis 403-485-2241
Wainwright, MD of	Wainwright – Crop Tech Agro	SW28-44-6-W4	James Schwindt 780-842-4454
Warner, County of	Border Seed Cleaning Plant	SW29-2-14-W4	Jamie Meeks 403-642-3635
Warner, County of	Sunshine Seed Cleaning Plant	NW12-6-19-W4	Jamie Meeks 403-642-3635
Westlock County	Westlock Regional Landfill	NE27-59-26 W4	Dennis Mueller 780-349-3346
Wetaskiwin, County of	Peace Hills Waste Transfer Station	SW29-46-24-W4	Steve Majek 780-352-3321
Wheatland County	Hussar Waste Transfer Station	NW1-24-20-W4	Russ Muenchrath 403-934-3321
Wheatland County	Standard Waste Transfer Station	SW10-25-22-W4	Russ Muenchrath 403-934-3321
Wheatland County	Strathmore Waste Transfer Station	NE34-23-25-W4	Russ Muenchrath 403-934-3321
Willow Creek, MD of	Willow Creek Regional Landfill	NW22-11-26-W4	Fred Gopdfellow 403-687-2603
Woodlands County	Fort Assiniboine – County Yard	SW2-62-6-W5	Dawn Fortin 780-584-3866
Yellowhead County	Parkcourt Waste Transfer Station	SE35-54-08-W5	Jennifer Benson 780-325-3782

Note: Some municipalities have other “temporary” sites for dropping off empty pesticide containers. Phone municipal contact for locations and operating hours.

Safety Precautions

Warning Symbols

Visual warning symbols on pesticide labels indicate the kind of harm that can result from pesticide misuse or mishandling. They alert the user to the degree of the hazard (by the shape of the border) and to the type of hazard (by the centre picture).

Flammable



The "fire" symbol is a warning that the pesticide is flammable or easily ignited. Keep the pesticide away from heat, sparks or open flames. Do not smoke while mixing or applying the product.

Explosive



The "exploding grenade" symbol indicates that the pesticide can explode, e.g. pesticide in pressurized cans. Explosive conditions may also be created by using Roundup or Rustler (glyphosate) in a galvanized steel spray tank.

Corrosive



The "corroded hand" symbol indicates that the pesticide is corrosive to the skin and eyes. The chemical is either acid or alkali (caustic) and can burn the skin. Protect the skin and eyes when using these products.

Poisonous



The "skull and crossbones" symbol warns that the chemical is poisonous if taken into the body. Keep the product out of reach of children. Use the appropriate safety measures when dealing with poisonous products.

Pesticide Toxicity, Hazard and Risk

The terms "toxicity," "hazard" and "risk" do not all have the same meanings. Users of pesticides should understand the difference in meanings among these terms.

Pesticides vary in **toxicity** or the degree of being poisonous. How poisonous a pesticide is depends on its inherent chemical and physical properties.

The relative **hazard** of a pesticide depends on the toxicity of the pesticide, the dose received and the length of time exposed. No hazard exists when the pesticide container is sealed, but once the seal is broken and the pesticide is handled, exposure can occur, and a hazardous situation is created.

Risk of exposure is a function of how an individual handles the product. Although the hazard may be the same whenever a pesticide is being poured into the spray tank, the risk is different if one person wears a hard hat, goggles, respirator, nitrile gloves, waterproof apron and neoprene or rubber boots and the other person wears none of these. A knowledge of the toxicity of a product and the potential for personal exposure can be used to lower the risk of exposure. The user can control the risk by carefully managing the hazard. Even when highly toxic pesticides are used, if the degree of exposure is kept low enough, the risk can be kept at an acceptable level. The toxicity of the pesticide can't be changed, but the risk can be managed.

LD₅₀ values are used to rate the toxicity of the pesticides. The LD₅₀ is an abbreviation for the dose (expressed in milligrams per kilogram of body weight of the test animal) that is lethal to 50 per cent of the

The following table relates the oral LD₅₀ value (mg/kg) of a pesticide to its toxicity symbol.

LD₅₀ less than 500 mg/kg
indicates high
toxicity



Danger Poison

LD₅₀ 500 - 1,000 mg/kg
indicates moderate
toxicity



Warning Poison

LD₅₀ 1,000 - 2,500 mg/kg
indicates low
toxicity



Caution Poison

LD₅₀ greater than
2,500 mg/kg indicates
very low toxicity

group of test animals. For example, if a pesticide has an oral LD₅₀ value of 10 mg/kg and the test animals each weigh 1 kg, 50 per cent of the animals would die of poisoning if each ate 10 mg of the pesticide.

The smaller the LD₅₀ value, the more toxic the pesticide. The LD₅₀ value usually refers to the active ingredient in the pesticide formulation. In this publication, the LD₅₀ of the formulated product is also given when available.

Symptoms of Poisoning

Pesticide poisoning can be acute (due to a single, large dose, like an accident) or chronic (due to continued exposure over a long period). For example, chronic health problems may develop after long term exposure to pesticides low in toxicity. Accidental contact with a pesticide, however, will not necessarily lead to poisoning. Both types of poisoning can exhibit mild, moderate or severe symptoms as follows:

Mild poisoning symptoms: Mild symptoms may be vague and can be compared with a sickness such as influenza. Typical symptoms include nausea, headache, tightness of chest, loss of appetite and stomach cramps. These symptoms can be immediate or be delayed by 12 to 24 hours.

Moderate poisoning symptoms: These symptoms are usually more pronounced than mild symptoms. They include nausea, trembling, lack of muscle co-ordination, excessive saliva, blurring of vision, tightness of chest, difficulty in breathing, flushed or yellow skin, abdominal cramps, vomiting, diarrhea, tearing from eyes, profound weakness, rapid pulse and cough.

Severe poisoning symptoms: Severe symptoms are often more specific and require immediate hospital treatment. They include vomiting, diarrhea, excessive sweating, inability to breathe, convulsions, fever, intense thirst and coma. It is imperative to reduce exposure when using all pesticides whether they are highly toxic or have very low toxicities.

Reducing the Risk of Exposure to Pesticides

Pesticides may enter the body through the skin (dermally), the mouth (orally) or the nose (inhalation).

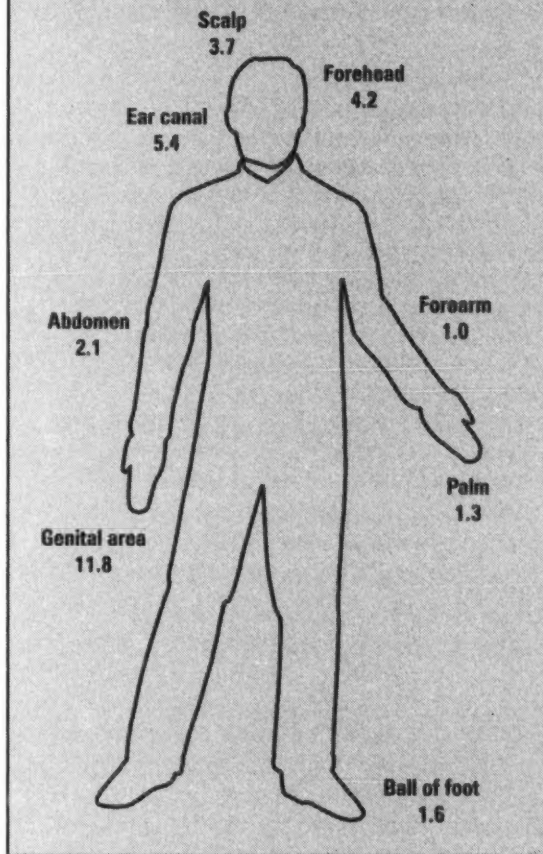
Skin

Absorption through the skin is the most common route of exposure. Different areas of the body absorb pesticides at different rates. For example, assuming the forearm is given an absorption rate of 1.0, the relative absorption rate of pesticides in the ear canal is 5.4, on the scalp 3.7, on the forehead 4.2 and the genital area 11.8 – almost 12 times greater than the forearm.

The genital area and the head are the areas where absorption is the greatest.

Absorption Rates

Compared to forearm, which is 1.0



Reducing the risk of exposure through the skin is possible through the careful selection, use and care of protective clothing and safety equipment.

Protective clothing and equipment can provide a barrier that reduces contact between the skin and pesticides. See the section on *Protective Clothing and Equipment* for recommended wear. To help reduce pesticide build-up, clothing should be washed daily using recommended procedures; see *Cleaning of Clothes and Equipment* section.

How skin is exposed to pesticides:

- Direct handling of pesticides – this includes any activity where the pesticide could come into direct contact with the skin, from spills and splashes during mixing and handling of the concentrated pesticide, during equipment adjustment and from spray drift during application. The greatest risk occurs when the chemical concentrate is being handled; extra protection should be used at that time. The use of a waterproof apron is highly recommended when handling all pesticide concentrates, regardless of toxicity.
- Transfer from contaminated clothing or equipment – clothing worn during pesticide use should be restricted to that use only, thereby eliminating the possibility of continued dermal exposure due to pesticide residues remaining in the clothing. Some types of concentrated pesticides are not removed after multiple washings. Clothing contaminated by accidental spills of concentrated pesticide should be discarded rather than laundered. Avoid entering the house wearing contaminated clothing and equipment. Pesticides may be transferred from boots to floors and carpets where children and pets may be exposed.
- Transfer to other clothing during washing – always store and wash pesticide-contaminated clothing separately from the rest of the family wash as pesticides can be transferred to other clothing during the laundering process.

Protective Clothing and Equipment

Even pesticides not absorbed by the skin may still cause skin problems such as redness, blisters or dry scaliness, which may lead to serious skin eczema and dermatitis. Good personal hygiene is important to help minimize pesticide absorption through the skin. Shower, shampoo your hair and put on clean clothing immediately after you finish using pesticides for the day or after an accidental spill. Cuts and scrapes should be cleaned and bandages changed after handling pesticide to avoid possible dermal absorption from contaminated bandages.

Eyes

Eyes are very sensitive to pesticides and can be exposed to vapour or fumes, dust, spray drift, or accidental spills and splashes when containers of liquid concentrates are being opened or when the concentrated chemical is being poured into the sprayer tank. Do not wear contact lenses when mixing or applying pesticides.

Ears

Sprays and spills may contaminate the head and ear canal.

Nose

Pesticides can enter the body through breathing in fumes, dusts or spray mists. Fumes and extremely fine particles of dust or spray can be completely absorbed by the lungs. To minimize exposure, respirators always should be worn when opening and mixing all concentrated pesticides. Read the pesticide label and follow the precautions outlined. A respirator may be required when applying pesticides.

Mouth

Pesticides can enter the body through the mouth when users eat, lick their lips or smoke when hands are contaminated. Face and hands should be washed thoroughly prior to eating or smoking. Children may be poisoned if they drink pesticides stored in pop bottles. All pesticides must be stored in their original containers and should be placed in a locked area out of reach of children.

Minimum Protection

A minimum level of protection is required when working with dilute, less toxic or granular pesticides. Where there is a direct contact with the pesticide, add extra protection.

Hard hat
(wide brimmed,
no leather liner)

Coveralls
cloth or disposable
(wear closed at neck,
over long-sleeved shirt
and full-length pants)

Gloves
unlined, nitrile or
neoprene (cuff gloves
and wear sleeves over
gloves)

Boots
neoprene overboots or
high rubber boots
(wear pants outside boots)



Extra Protection

Extra protection is required for mixing, loading and handling pesticide concentrates, especially when working with highly toxic pesticides. Check pesticide label.

**Goggles or
face shield**

Respirator
(check label if needed
for less toxic pesticides)

Hooded coveralls
chemically resistant
(when mixing,
loading or applying
very toxic pesticides
and when application
drenches applicator)

Waterproof apron
(when handling all
concentrated pesticides)



Coveralls

Wear coveralls, closed at the neckline and wrists and over full-length pants and long-sleeved shirts, also worn closed at the neckline and wrists.

Minimum protection

- Cloth – if cotton or cotton/polyester coveralls are worn, they should be washed after daily use. Some pesticides are difficult to remove from cloth.
- Disposable, nonwoven – a number of limited use, disposable, nonwoven, hooded coveralls are now on the market; instead of laundering, they are disposed of at an approved landfill and thus, the problem of decontamination is avoided. Not all disposables are suitable for pesticide use, especially for liquid pesticides. Check with your supplier.

Common disposable brands are Kimberly-Clark KleenGuard LP (Liquid Protection) and DuPont Tyvek. Both disposables provide an extra layer of protection. Check for comfort and size before purchase. Disposable coveralls are more fragile than standard ones and are only expected to last a limited number of wearings.

Extra protection

- DuPont's Tyvek QC (polyethylene coated Tyvek) and Tyvek/Saranex (saran coated Tyvek) provide greater durability and are more repellent to larger pesticide spills. However, they are more expensive and must be specially ordered. These coveralls are uncomfortable when worn for long periods in hot weather because of heat build-up and lack of breathability.
- Impermeable rainwear – two styles are available: coveralls or two-piece suits. They are similar in price to the more expensive disposable coveralls. Generally, they are a P.V.C. (polyvinyl chloride) coating on nylon. Although excellent in liquid repellency, they too can be uncomfortable because they do not breathe and cannot be worn for long periods in hot weather. After use, they should be hosed down and washed with soap and water.

Remember, When Using Disposable Coveralls . . .

- Before purchasing any disposable coveralls, make sure they are recommended by the manufacturer for pesticide use. Avoid wearing all-purpose disposables.
- When removing disposable coveralls, take care not to contaminate the interior if the coveralls are to be worn more than once. Between wearings, hang in a well ventilated area, away from other clothing.
- Do not launder disposables, but do launder all clothing worn under disposables, just as you would other clothing worn during pesticide use.
- Replace with a new coverall when severe pilling (balls of fiber on the surface), rips or holes occur. To discard, place in a plastic garbage bag and take to an approved landfill site; do not burn.

Gloves

Unlined gloves are required when handling, mixing or pouring concentrated pesticides, during field application and when equipment needs adjusting. Never use bare hands to do these jobs. Studies reveal that the greatest exposure is often through the hands. A variety of glove materials may be found on the market. Unlined nitrile and neoprene gloves are suitable for most pesticides. All gloves should be washed soon after the concentrated chemical has been mixed as pesticide may penetrate into the material if it is not cleaned off. Care should be exercised to avoid contaminating the interior of gloves when they are taken off and put on. If possible, wash the outside of the gloved hands prior to glove removal, to avoid contaminating the interior. At the end of the day, both the inside and outside of the glove should be washed.

Prior to use, inspect gloves and replace immediately if cracks, swelling, discolouration, holes or rips develop. Cuff glove and wear sleeves over top of gloves to help prevent spills and splashes of pesticides from running down inside the gloves. Do not continue to wear contaminated gloves and avoid wearing leather, cloth or natural rubber gloves as they soak up the chemical and become a source of continuous contamination.

Boots

Neoprene overboots or long rubber boots are the recommended footwear as they are less likely to absorb pesticides and are more easily cleaned. Be sure to wear the pant leg over the boot to avoid pesticides running down into the boot. In case of such an accident, wash the boots out immediately; otherwise, wash the outside of the boots daily.

Minimum protection

Prevent powders, dusts or spray mists from being deposited on the hair or scalp by wearing a hard hat. The hard hat should be washed daily. Avoid the use of a hard hat with a leather inner band.

Extra protection

Protect hair, scalp, ears and neck from dust, sprays and spill when you are likely to contaminate the head area. Wear a wide brimmed hat that covers the neck or hooded coveralls, with the hood under the hard hat. Only wear ear plugs if required for hearing protection. Use disposable ear plugs made of self-molding foam, and dispose of them after use.

Goggles or face shields

Protect the eyes and face against pesticide vapours, dust and splashes when handling concentrated pesticides. Goggles and face shields must have resistance to chemicals and have ventilation to prevent fogging. Clean after each day of use and store away from direct sunlight.

Avoid Wearing

(These materials absorb chemicals and prolong exposure to the wearer; most are not easily cleaned).

- fabric baseball caps
- cloth or leather gloves, shoes or boots
- natural rubber or plastic gloves (not resistant to pesticides)
- leather belts, watch bands, PDA and cell phone holders
- contact lenses

Respirators

Purchase a respirator recommended for the pesticides used and make sure it fits properly. A good airtight fit is required over the nose and mouth; beards and moustaches can prevent a close fit.

Respirators have two cartridges attached onto a facepiece. Each cartridge contains a pre-filter that removes dust particles and a filter of activated charcoal that absorbs the chemical. The cartridges should be unscrewed and replaced as soon as any odor of the pesticides is detected in the facepiece. Clean respirators after each day's use; unscrew the cartridges and wash the facepiece with soap and water. Rinse the facepiece in clean water, dry with a clean cloth and screw on the cartridges. The clean respirator should be stored away from direct sunlight in a sealed plastic bag to prevent cartridges from absorbing airborne contaminants. Disposable respirators are also available. Replace as soon as any pesticide odor is detected. Wash after daily use – do not get the charcoal filter wet. Store in a sealed plastic bag. **Note:** Gauze and dust masks are not respirators and are not recommended for pesticide use!

Gas masks

These are used when an applicator is likely to be exposed to very high levels of pesticides (fumigants). The face piece covers the eyes, nose and mouth. It is connected by a flexible hose to a charcoal canister worn on the belt. The lifespan of this canister is longer than that of the respirator cartridges. Manufacturer's directions are to be followed for cleaning and storing gas masks and canisters.

Minimize Exposure

- wear recommended protective clothing and safety equipment
- limit clothing worn for pesticide use to that use only
- wash clothing and equipment daily after use
- replace clothing and equipment that is no longer serviceable

Cleaning of Clothes and Equipment

Skin can absorb chemicals from inadequately cleaned clothing and equipment. Safe removal of pesticide demands special care in handling and washing contaminated clothes.

Handling pesticide soiled clothing

- handle soiled clothing with unlined, nitrile gloves
- remove pesticide granules from cuffs and pockets outdoors
- discard any garment saturated with pesticide concentrate
- temporarily store clothing in disposable plastic bags before washing
- take disposables to approved landfill

Washing pesticide soiled clothing

- wash daily
- wash separately from regular laundry
- pre-treat with a stain removal product if an emulsifiable formulation used, or
- pre-rinse on pre-soak cycle of washer
- avoid overcrowding washer
- use hot water setting
- use full water level and normal cycle
- use extra heavy duty detergent as recommended for heavily soiled loads
- repeat wash procedure
- clean washer after use (run empty washer through full cycle with hot water and detergent)

Drying

- line dry to prevent contamination of dryer and increase the chemical breakdown of pesticide residues

Washing other equipment

- wash other equipment daily in hot soapy water: hard hat, goggles, apron, gloves, boots and respirator (avoid getting charcoal wet; remove if possible)

Specific Cleaning Procedures for Pesticides

The standard washing procedure mentioned above reduces pesticides from contaminated clothing, but new research is gradually identifying more specific washing procedures to further reduce the residues on contaminated clothing or equipment. Note that each product requires unique washing procedures, and more testing is required for those that still have high residues remaining. Refer to the guide below:

Recommendations

- 18 per cent residue is an unacceptable level. For better protection, choose a disposable coverall and discard after use.
- Soak contaminated clothing in undiluted limonene for required time. (Examples of this product are Odor Crush or Citra-Solv.).
- Pre-treat contaminated clothing before washing, let soak.
- Fill 70 L washing machine with warm water (50°C); add 280 mL of chlorine bleach. Soak for required time. (**Note:** loss of strength and colour results from bleach soak, more so for cotton than for cotton/polyester blends)
Note: Acceptable levels of residue remaining – less than 3 per cent.

For further information on protective clothing for pesticide use, contact the Alberta Ag-Info Centre toll-free at 310-FARM (3276) or 1-866-882-7677.

Product	Suggested washing procedure	% Residue remaining
2,4-D (amine)	One wash	<1%
2,4-D (ester)	1/2 hour Limonene soak (2) (degreaser), one wash	18% (1)
Captan	One wash	1%
Chlorpyrifos (Lorsban, Dursban, Pyrinex)	3 hour bleach soak (4), one wash	<1%
Diazinon	Hot wash (60°C) or Spray'n Wash soak, one wash	1%
Iprodione (Rovral)	One wash	1%
Malathion (diluted)	Two washes	3%
Triallate (Avadex)	Spray'n Wash soak (3), two washes	18% (1)
Any concentrated pesticides	Discard	Too high

Source: *Effective Pesticide Decontamination Procedures for Clothing, Equipment and Spills*, Research Project Report, University of Alberta, Alberta Occupational Health and Safety Heritage Grant Program, 1994.

Other Precautions and Safety Tips

Fresh water supply

Always carry a supply of fresh water to clean up accidental spills and a clean pair of gloves for equipment adjustments.

Remote control devices

Devices (e.g. solenoid valves) can be installed to remotely control the sprayer, preferably from within the tractor cab. These devices can reduce operator exposure to pesticides.

Tractor cab cleanup

After spraying pesticides, the inside of the tractor (seat, steering wheel, etc.) can be decontaminated by wiping with warm soapy water and a sponge.

Tractor cab filters

Charcoal filters are available for fitting onto the tractor air intake system, to filter out pesticides from the air entering the tractor cab. The use of these filters is highly recommended to reduce pesticide exposure during spraying operations. Check with tractor manufacturers to determine which charcoal filter is recommended for your tractor.

Grazing and Haying Restrictions

Traditionally, pesticides have been registered for use on crops grown to maturity. Grazing or cutting of the immature crop for hay has not been considered as the intended use, so residue information on the immature plant has not been requested in the registration process. A grazing or haying interval is considered in the registration process only if the green matter is to be fed to livestock. Consequently, many pesticide labels are currently silent about grazing, i.e. there is no statement on the label as to whether or not it is safe to graze the crop(s) listed on the label prior to maturity. The absence of this information may lead producers to assume that since there is no specific warning with respect to grazing, it is safe to do so.

Present pesticide labelling policy is meant to define only the acceptable uses of the product. It does not list or take into account the "do not's." Therefore, it cannot be assumed that if something is not stated on the label, it is accepted for use. A new accepted use can only be made through the submission of relevant data to support that use.

In light of the above, pesticide labels that are silent on grazing will carry the following statement: "Do not graze the treated crops or cut for hay; there are not sufficient data available to support such use."

Honey bee safety

Bees may be affected by pesticides. Avoid spraying near hives or contaminating puddles of water from which bees may drink. Spray early in the morning or late in the afternoon when bee activity is at a minimum. Warn beekeepers of your intentions, so they can confine the bees or move them until spraying is over.

Farm Safety Program

For further information on farm safety, please contact the Farm Safety Program of Alberta Agriculture and Rural Development at 7000 - 113 Street, Edmonton, Alberta, T6H 5T6.

Safety Equipment and Clothing

Protective clothing and equipment is available from the following:

Local U.F.A. and safety equipment suppliers
 Fleck Bros.
 1-800-262-9063
 Levitt-Safety Limited
 1-800-661-3973
 Acklands-Grainger Inc.
 1-800-661-3950

First Aid

Poison Information Centres
(Alberta) 1-800-332-1414
(Calgary only) 944-1414

The emergency department of most hospitals can deal with pesticide poisoning. However, the Poison Centre in Calgary can provide information on recognizing poisoning symptoms and in giving the right treatment. It offers a 24-hour toll free service.

Some manufacturers have emergency telephone numbers to call in case of pesticide poisoning.

BASF Canada
1-800-454-2673

Bayer CropScience Inc.
Prosar
1-800-334-7577

Dow AgroSciences Canada Inc.
1-613-996-6666

DuPont Canada Inc.
1-613-348-3616

Monsanto Canada Inc.
1-314-694-1000 or 1-800-332-3111

Nufarm Canada
1-877-325-1840

Syngenta Crop Protection Canada Inc.
1-800-327-8633

United Agri Products
1-800-561-8273

Interprovincial Cooperative Ltd.
1-613-996-6666

Standard First Aid Measures

Before using a pesticide, look for the warning symbol on the label. This label indicates the toxicity of the pesticide. If you are severely exposed to a pesticide and you are alone, do not panic. The symptoms of the pesticide do not show up immediately. You will have some time to decontaminate yourself.

If in eyes

Wash eyes with water at once. Hold the eyelids open and wash eyes for at least 15 minutes with fresh water each time. Get help to take you to the emergency department of the nearest hospital and take the labelled container with you. Do not use any eye medication unless prescribed by a doctor.

If on skin

Get any spilled pesticide off your body immediately. If the pesticide is on your clothes, remove them and rinse your skin with water. After rinsing, wash the area with soap and water. Obtain medical attention if area of contact is large or if irritation persists.

If swallowed

If swallowed: Have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

If the product contains a petroleum distillate:

If swallowed: Call a poison control centre or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.

Glossary of Terms in Pest Control

Active ingredient (a.i.): The concentration of chemical in a formulated product responsible for action.

Antagonism: Opposing action of different chemicals such that the sum of their total effect is less than the effect if each pesticide were used alone.

Antidote: A first aid treatment to offset the toxic effect of a pesticide.

Bioassay: Determination of concentration of a pesticide by comparing its effect on a test organism with that of a standard preparation.

Adjuvant: Any substance added to a pesticide formulation or spray tank to facilitate application.

Chlorotic: Loss or fading of green colour in foliage.

Contact pesticide: Causes localized injury to plant tissue, or causes an effect when the pesticide hits the pest or the pest contacts the treated surface.

Degradation: Breakdown of a pesticide by action of air, water, sunlight, microbes or other agents.

Desiccant: Chemical use to accelerate drying of plant tissues.

Efficacy: Effectiveness of chemical on the pest.

Established forage: A forage crop that has gone through three months of a growing season.

Foliar application: Made to the leaves of plants, as opposed to soil application.

Formulation: Form in which the manufacturer prepares a pesticide to facilitate its use: granular, solution, emulsifiable concentrate, dry flowable, liquid flowable, wettable powder.

Fumigant: Vapour active chemical used against pests.

Incompatibility: Where one pesticide is mixed with another causing unsatisfactory results.

Inhibit: Prevent or stop a process, e.g. inhibits photosynthesis.

LC₅₀: Lethal concentration – amount of pesticide in air or water that can kill 50% of the organism.

LD₅₀: Lethal dose – quantity of herbicide that will kill 50% of a test population.

Mode of action: The specific mechanism through which a pesticide affects a pest.

Necrosis: Localized death of plant tissue, usually characterized by browning and desiccation.

Non-cropland: Land not in crop production or not intended for crop production.

Pesticide group: A number of pesticides that have the same mode of action.

Photosynthesis: Process by which green plants use sunlight, carbon dioxide and water to produce plant food.

Phytotoxic: Injurious to a plant.

Plant growth regulators (PGR): Chemical that affects the normal growth process of plants.

Preharvest interval (PHI): Time (days) between the last application of the pesticide and harvest. Harvest includes cutting (swathing) or grazing; it does not include combining or baling for hay.

Residual herbicide: Persists in soil, kills regrowth and/or germinating seedlings over an extended time.

Resistance: A genetic change in a pest population as a result of selection by a pesticide, which results in a loss of control.

Synergism: Complementary action of different pesticides such that the total effect is greater than the sum of their independent effects.

Systemic pesticide: Able to move in the plant, insect or other organism from the initial point of contact.

Weed control: A minimum of 80 per cent reduction in weed stand and/or growth.

Weed suppression: A minimum of 60 per cent reduction in weed stand and/or growth.

Alberta Agriculture and Rural Development Offices

Alberta Ag-Info Centre
Call toll-free 310-FARM (3276)

Field Offices

Location	Address	Phone Number	Fax Number
Airdrie	97 East Lake Ramp NE	403-948-8546	403-948-2069
Barhead	2nd Floor Provincial Building 6203 - 49 Street	780-674-8268	780-674-8309
Brooks	CDC South Hargrave Building #6 301 Horticultural Station Road East	403-362-1321	403-362-1326
Camrose	5712 - 48 Avenue	780-679-5173	780-679-5175
Fairview	213 Provincial Building 10209 - 109 Street	780-835-7536	780-835-3600
Grande Prairie	1201 Provincial Building 10320 - 99 Street	780-538-6208	780-538-5288
Leduc	Agri-Food Business Centre 6547 Sparrow Drive	780-980-3534	780-980-4237
Lethbridge	Agriculture Centre 5401 - 1 Avenue South	403-381-5849	403-382-4526
Olds	201 Provincial Building 5030 - 50 Street	403-556-4328	403-556-7545
Red Deer	Provincial Building 4920 - 51 Street	403-340-5532	403-340-4896
Stettler	Provincial Building 4705 - 49 Avenue	403-742-7540	403-742-7527
Stony Plain	Provincial Building 4709 - 44 Avenue	780-968-3516	780-963-4709
Vermilion	Provincial Building 4701 - 52 Street	780-853-8240	780-853-4776

Herbicide Index

Name	Page/s	Name	Page/s
Chemical Weed Control in Alberta	39	<i>bentazon</i>	90
Conservation tillage and herbicides	39	Betamix/Betamix β	94
Nitrate poisoning of livestock	39	Bison 400L	53
Weed control in forage crops	40	Bonanza 10G/Bonanza 480 EC	267
Herbicide performance ratings	40	Broadband	96
Water Used for Spray Application	40	Broadside	224
Herbicide and water quality	40	<i>bromacil</i>	168
Pesticide Resistance	41	<i>bromacil</i> + 2,4-D	238
The problem	41	<i>bromacil</i> + diuron	174
How to identify herbicide resistance	41	Bromotril	199
How to minimize the development		<i>bromoxynil</i>	199
of resistance	41	<i>bromoxynil</i> + 2,4-D	100
Herbicide resistant weeds in Alberta	42	<i>bromoxynil</i> + MCPA	97
Herbicide Group Classification by		Brotex 240	199
Mode of Action	42	Buctril M	97
2,4-D (amine, ester)	47	Caliber	119
Absolute	49	Calmix Pellets	100
Accent	51	carfentrazone + glyphosate	103
Achieve (Liquid Achieve SC)	53	Casoron G-4	101
Achieve Liquid Gold	55	Centurion	239
Accurate	59	Cheminova Glyphosate	146
Adrenalin SC	57	<i>chlorsulfuron</i>	257
Ally Toss-N-Go	59	Cleanstart	103
Altitude FX	62	Clearout 41	146
<i>aminopyralid</i> + 2,4-D amine	233	<i>clethodim</i>	239
Amitrol 240	64	<i>clodinafop propargyl</i>	165
Approve	260	<i>clodinafop propargyl</i> + <i>bromoxynil</i>	244
Arrow 240 EC	239	<i>clodinafop propargyl</i> + <i>bromoxynil</i> +	
Arsenal	66	MCPA ester	246
Assert 300 SC	68	<i>clodinafop-propargyl</i> + MCPA + mecoprop P +	
Assert FL	70	dicamba	106
Assure II	72	<i>clodinafop-propargyl</i> + <i>thifensulfuron methyl</i> +	
Atrazine	74	tribenuron-methyl	162
Attain XC	75	<i>clodinafop-propargyl</i> + <i>thifensulfuron-methyl</i> +	
Authority	77	tribenuron-methyl + dicamba	159
Avadex MicroActive/Extra Strength Avadex BW	79	<i>clopyralid</i>	178
Avenge 200-C	82	<i>clopyralid</i> + glyphosate	116
Avert	68	<i>clopyralid</i> + imazamox	258
Axial 100 EC	84	<i>clopyralid</i> + imazamox + imazethapyr	49
Badge	97	<i>clopyralid</i> + MCPA ester	104
Banvel II	86	<i>clopyralid</i> + MCPA ester + <i>tepraloxymid</i>	138
Barricade	89	Clovitox Plus	277
Basagran	90	Cobutox	119
Basagran Forte	90	Cordon	217
Benchmark	93	Credit/Credit 45	146
Bengal	217	Curtail M	104
		Cypress	106

Name	Page/s
Deploy.....	108
dicamba.....	86,282
dicamba + MCPA K-salt.....	112
dicamba + mecoprop-p + 2,4-D amine.....	114
dichlobenil.....	101
diquat.....	229,236
diuron.....	172
Diurex 80W.....	172
Dual II Magnum.....	111
DyVel.....	112
DyVel DSP.....	114
2,4-D + dichlorprop.....	126
2,4-DB.....	119
Eclipse III.....	116
Edge Granular.....	117
Embutox.....	119
Eptam 8-E.....	121
EPTC.....	121
Equinox EC.....	122
Escort.....	125
Estaprop Plus.....	126
Estaprop Plus XT.....	126
ethalfuralin.....	117
ethametsulfuron methyl.....	187
ethofumesate.....	190
Etho SC.....	190
Everest.....	129
Everest GBX.....	131
Express SG.....	135
Express Pro.....	133
Factor 540.....	146
fenoxaprop-p-ethyl.....	217
FirstStep Complete.....	137
FlaxMax DLX.....	138
florasulam + 2,4-D.....	144
florasulam + bromoxynil.....	93
florasulam + glyphosate.....	208
florasulam + MCPA ester.....	142
florasulam + MCPA + clopyralid.....	251
flucarbazone sodium.....	129
flucarbazone sodium + glyphosate.....	206
flucarbazone sodium + fluroxypyr.....	131
flumioxazen.....	202
fluroxypyr + dicamba.....	216
fluroxypyr + clopyralid + MCPA ester.....	209
fluroxypyr + florasulam + MCPA ester.....	253
fluroxypyr + MCPA ester.....	275
fluroxypyr + tribenuron methyl + thifensulfuron methyl.....	89
Foothills.....	165
Fortress.....	140
fosamine-ammonium.....	173

Name	Page/s
Frontline 2,4-D.....	144
Frontline XL.....	142
Gladiator.....	220
glufosinate ammonium.....	176
Glyfos.....	146
Glyphogan Plus.....	146
Glyphosate.....	146
glyphosate + dicamba.....	237
Gramoxone.....	156
Grazon.....	158
Harmony K.....	159
Harmony Max.....	161
Harmony SG.....	162
Hawkeye Power.....	86
Heat.....	164
hexazinone.....	285
Horizon NG.....	165
Hyvar X/X-L.....	168
imazamox.....	249
imazamox + 2,4-D.....	57
imazamox + bentazon + UAN.....	287
imazamox + clopyralid.....	258
imazamox + imazethapyr.....	194
imazamox + imazethapyr + clopyralid.....	49
imazamox + imazethapyr + tepraloxymid.....	196
imazethapyr.....	220
Infinity.....	170
IPCO Dichlorprop-D.....	126
IPCO Dichlorprop-DX.....	126
Karmex XP.....	172
KnockOut Extra.....	146
Koril.....	199
Krenite.....	173
Krovar I.....	174
Ladder.....	165
Leader.....	260
Legend.....	165
Liberty 150 SN.....	176
Linuron.....	181
linuron.....	181
Logic M.....	97
Lontrel 360.....	178
Lorox.....	181
Marengo.....	53
Maverick III.....	146
MCPA (amine, ester, K- and Na-salts).....	183
MCPA + mecoprop-p + dicamba.....	255
MCPA + dichlorprop-p + mecoprop-p.....	196
MCPB + MCPA.....	277
Mecoprop.....	186
meconoprop.....	186
metolachlor.....	111

Name	Page/s	Name	Page/s
metolachlor + atrazine	211	Reglone Desiccant	229
metribuzin	241	Remedy EC/Remedy MSO	231
metsulfuron-methyl	59,125	Restore	233
metsulfuron-methyl + tribenuron methyl	133	Retain	234
Mextrol 450	97	Reward	236
MPower Aurora	165	rimsulfuron	214
MPower Glyphosate	146	Rival 10G/Rival EC	267
Multistar	220	Roundup Transorb II	146
Muster Gold II	189	Roundup Ultra2	146
Muster Toss-N-Go	187	Roundup WeatherMax	146
NextStep	165	R/T 540	146
nicosulfuron	51	Rustler	237
Nimble	108	saflufenacil	164
Nortron	190	Select	239
Nuance	192	Sencor	241
Nufarm Clodinafop	165	sethoxydim	203
NuGlo	146	Shadow RTM	239
Odyssey	194	Sharpshooter/Sharpshooter Plus	146
Odyssey DLX	196	Signal	165
Optica Trio	198	Signal D	244
Oracle Dicamba	86	Signal M	246
Pace	206	simazine	213
paraquat	156	Simazine 480	213
Pardner	199	Simplicity	247
Payload	202	Solo	249
phenmedipham + desmedipham	94	Spectrum	251
picloram	264	Spike-Up	137
picloram + 2,4-D	158	Start Up	146
pinoxaden + florasulam	96	Stellar	253
pinoxaden + clodinafop-propargyl	265	sulfentrazone	77
Poast Ultra	203	Sword	255
Polaris	146	Tackle	237
Prepare/PrePare Complete/Pace	206	Target	255
PrePass	208	Telar	257
Prestige XC	209	Tensile	258
Primextra II Magnum	211	tepraloxym	122
Princep Nine-T	213	tepraloxym + clopyralid + MCPA ester	138
Prism	214	thiencarbazone-methyl + pyrasulfotole + bromoxynil	284
Pulsar	216	thifensulfuron-methyl + tribenuron-methyl	108,226
Puma Advance	217	thifensulfuron methyl + tribenuron methyl + MCPA ester	224
Puma ¹²⁰ Super	217	thifensulfuron methyl + tribenuron methyl + quinclorac	272
Pursuit 240	220	thifensulfuron methyl + tribenuron methyl + fluroxypyr + clodinafop propargyl	161
Pyramin	222	Thrasher	260
pyrasulfotole + bromoxynil	170	Thumper	260
pyrasulfotole + fenoxaprop-P-ethyl + bromoxynil	279	Titanium	262
pyrazon	222	Topside	277
pyroxsulam	247	Tordon 22K	264
quizalofop-p-ethyl + ethametsulfuron methyl	189		
Refine M	224		
Refine SG	226		

Name	Page/s
Touchdown Total.....	146
tralkoxydim	53
Tracker XP.....	255
tralkoxydim	53
tralkoxydim + bromoxynil + 2,4-D ester	262
tralkoxydim + bromoxynil + MCPA.....	55
Traxion.....	146
Traxos	265
Treflan	267
triallate + trifluralin	140
tribenuron-methyl.....	135,192
tribenuron-methyl + dicamba + 2,4-D ester	274
tribenuron-methyl + metasulfuron-methyl	133
triclopyr.....	231
Trifluralin.....	267
triflurosulfuron methyl.....	280
Triton C.....	272

Name	Page/s
Triton K.....	274
Trophy.....	275
Tropotox Plus	277
Tundra	279
Turboprop	126
Turboprop 600	126
UpBeet	280
Vanquish	282
Vantage Plus Max II.....	146
Velocity m3/Velocity m3 All-In-One	284
Velpar L/Velpar DF.....	285
Vigil	217
Viper	286
VMD 480.....	282
WildCat.....	217
Wise Up.....	146
Yuma.....	72

Chemical Weed Control in Alberta

Chemical weed control functions on the basis that certain chemicals are capable of killing some kinds of plants (weeds) without injury to other kinds (crops). As a group, these chemicals are called herbicides.

Herbicides are effective tools for the control of weeds, and **herbicides demand respect**. When properly used, herbicides can safely and effectively accomplish their objective; misused, they can cause severe economic loss. The misuse of herbicides is usually due to:

- ignorance of their characteristic activity and/or
- carelessness in their application

Misuse includes such factors as applying improper dosages; using the wrong herbicide; failure to properly calibrate application equipment; failure to wash application equipment thoroughly before switching herbicides; improper soil incorporation; timeliness of application, with respect to the growth stage of crop or weed.

This guide lists the major herbicides registered for field crop use in Alberta. Refer to product labels attached to the herbicide containers for final detailed information.

Conservation tillage and herbicides

Conservation tillage is a general term used to describe a cropping program in which some or all of the tillage operations are replaced by using herbicides

to control weed growth while, at the same time, preventing soil erosion and conserving soil moisture. The following terminologies are included under conservation tillage: reduced tillage, minimum tillage, no-tillage or zero tillage, direct drilling and chemical fallow.

Herbicides for conservation tillage are listed below. Rates of application, weeds controlled and other pertinent information can be found by referring to each herbicide in this guide.

- **2,4-D or MCPA** – To control winter annuals such as flixweed, shepherd's-purse and stinkweed. Application should be made to emerged weeds prior to freeze-up.
- **Glyphosate Formulation** – Apply any glyphosate formulation mixed with a non-ionic surfactant (if required) to actively growing weeds. Can be tank mixed with Banvel; 2,4-D amine; Pardner.
- **Rustler** – Controls annual grasses, broadleaf weeds and volunteer cereals. Can be tank mixed with 2,4-D.

Nitrate poisoning of livestock

Nitrate accumulations may be caused by leaf damage from frost, hail or herbicide action. Symptoms of nitrate poisoning include reduced milk production and growth rate, abortions and in severe cases, death by suffocation. A veterinarian should be called

immediately if livestock show unusual symptoms when they are fed forages that may contain nitrates.

After severe frost, hail or herbicide damage, the nutrient value of the crop will decrease rapidly. In terms of nutrition, it is important to harvest as soon as practical; however, in the case of herbicide treated crops, there may be a waiting period specified on the herbicide label. Especially in the case of high risk crops, such as oats or corn, a delay may be advisable to permit nitrate levels to decrease. If there is a possibility of high nitrates in feed, have the feed analyzed at a feed testing laboratory.

Weed control in forage crops

Make sure all forages, as well as any companion crops, present in the stand are listed for the intended use on the herbicide label. Follow the label directions on the herbicide container closely, especially for stage of crop and weed development, water volume, grazing and feeding restrictions.

Herbicide performance ratings

Herbicide performance ratings (numbers in brackets after the names of crops or weeds) are based on data from the Expert Committee on Weeds (Western Section) Research Reports. These numbers are not absolute and, therefore, not a guarantee of expected performance. They are meant to be used as a guide when selecting a herbicide. When a number is not included, there is not sufficient data to provide a rating.

Tolerance of crop to herbicides

The number appearing in brackets following the crop on which each herbicide is registered represents the expected tolerance of the crop to that herbicide. Due to variations in variety, weather, timing and

application techniques, this number is only approximate. 0 = complete kill of the crop and 9 = no measurable injury to the crop.

Level of weed control with each herbicide

The number appearing in brackets after each weed represents the average level of weed control expected with the herbicide. Due to variation in weather, growth stage, time of day, application technique, etc., this number is only approximate.

0 = no control of the weed and 9.0 = complete kill of the weed. A weed control rating of 7.0 or greater is considered commercially acceptable.

Water Used for Spray Application

The quality of water used can affect the efficacy of some herbicides. Water quality includes the cleanliness (silt, organic matter and soil), the hardness or softness of the water and the water pH.

Some herbicides, including glyphosate containing herbicides, adsorb to silt and organic matter, become inactivated. This causes a decrease in herbicidal activity. Suspended soils and organic matter in water is usually a problem where surface water is being used.

Other herbicides, including 2,4-D amine and several Group 1 herbicides have reduced efficacy when applied in mineralized water. Minerals include both calcium and magnesium sulfates, which result in 'hard' water, and excessive sodium bicarbonate, which results in 'soft' water. Mineralized water is most commonly a problem when well-water is used. When efficacy decreases, it is most apparent on hard to control weeds and is easily confused with late application, poor growing conditions or reduced herbicides rates.

Herbicide and Water Quality		
Herbicide	Quality concern	Remedy
2,4-D amine*	Mineralized water	Use a non-ionic surfactant like Agral 90
Achieve (tralkoxydim)	Mineralized water	Add ammonium sulfate (1% v/v)
Poast (sethoxydim)	Mineralized water	Add ammonium sulfate (1% v/v)
Roundup/Touchdown	Mineralized water	Add ammonium sulfate fertilizer 3 kg/100 L application solution
Roundup/Touchdown	Silty or dirty water	Filter water or use clean water
Select (clethodim)	Mineralized water	Add ammonium sulfate (1% v/v)

* **Note:** 2,4-D Ester formulation is not affected.

Information primarily derived from F. A. Holm, J. L. Henry, D. W. Gruber and P. McMullan, 1995 Water quality effects on phenoxy and ACCase inhibiting herbicides. Proceedings of the Weed Research/Symposium, University of Alberta.

The pH of water or water temperature can affect the ability of some herbicides to stay dissolved in the spray solution. To avoid these problems, the manufacturer will suggest a specific order to add surfactant or mixtures of products. For example, to mix the herbicide Horizon, the herbicide is added first, followed by the surfactant, Score, and all mixing is done under agitation. Other water conditioners out there include Choice Weather Master and N-Tank. Follow label recommendations for mixing. Products cannot work unless they are dissolved or miscible (capable of being mixed) in the water. Also, if products are not in solution they can form a sludge in the spray tank and block nozzles.

It is best to avoid using poor quality water if possible; however, the following remedies can limit the loss of herbicidal activity.

Pesticide Resistance

The Problem

Agricultural pests can develop resistance to fungicides, herbicides or insecticides. Resistance occurs when some pests survive a pesticide application; this part of the population is naturally more tolerant to the chemical. These individuals reproduce and create a population that is resistant to the pesticide. Producers should follow agronomic practices that both prevent or minimize the development of resistance and prevent the spread of existing resistant populations.

Since the first documented case of chickweed resistance in the mid 1980's, the numbers of herbicide resistant weeds, fungicide resistant diseases and insecticide resistant bugs have increased and the area infested by them continues to grow. At present in Alberta, more than 10 weed biotypes are resistant to chemicals from six herbicide groups. Potato blights are known to have developed resistance to common fungicides. Some insect pests are resistant to the *Bacillus thuringiensis*, a common biopesticide. In addition, some resistant pests are resistant to more than one pesticide group (see table below). It is essential that producers be able to identify these resistant pests and take action to minimize or prevent the development of resistance on their farms.

How to identify herbicide resistance

Investigate all areas of the sprayed field where weed control did not occur. Rule out other factors that might have affected herbicide performance including

mis-application, spray misses, unfavorable weather conditions, herbicide application at an improper leaf stage and weed flushes after application. If resistance remains a likely possibility, check for the following:

- Are other weeds listed on the product label controlled satisfactorily?
- Is herbicide failure patchy with no reasonable explanation?
- Did the same herbicide or herbicide group fail in this area of the field in the previous year?
- Do weeds show herbicide injury symptoms such as root pruning by a Group 3 herbicide or yellow/purple coloration caused by Group 2 applications. Resistant weed biotypes will not show these typical injury symptoms.
- Do field histories indicate extensive use of the same herbicide (or herbicide group) year after year?

How to minimize the development of resistance

Follow the guidelines below to delay the appearance of resistance:

- **Integrated weed management practices** – use herbicides as part of an integrated control program that includes scouting, historical information related to herbicide use and crop rotation, and consider mechanical, cultural, biological and other control practices.
- **Herbicide and crop rotations** – herbicides must be rotated. It is important not only to use a different herbicide, but to use one from a different herbicide group with a different mode of action.
- **Field history** – records are needed to make sensible decisions on herbicide rotation and to evaluate the probability of resistance developing. A pesticide application record sheet can be found at the back of this book.
- **Tank mixture** – a tank mix may delay the appearance of resistant weeds if the components of the tank mixture control the same weed by a different mode of action.
- **Monitor results** – Monitor treated weed populations for resistance development.
- **Preventive measures** – prevent the movement of resistant weed seeds to other fields by cleaning harvesting and tillage equipment as well as planting clean seed.

Herbicide Resistant Weeds in Alberta

Herbicide group	Weeds
Group 1	Green foxtail, wild oats
Group 2	Ball mustard, chickweed, cleavers, hemp-nettle, kochia*, Russian thistle, spiny annual sow thistle, stinkweed, wild mustard, wild oats
Group 3	Green foxtail
Group 4	Hemp-nettle
Group 8	Wild oats
Group 1 + 2 + 25 (multiple resistance)	Wild oats
Group 1 + 2 + 8 + 25 (multiple resistance)	Wild oats
Group 1 + 3 (multiple resistance)	Green foxtail
Group 2 + 4 (multiple resistance)	Cleavers

- Surveys of prairie kochia fields have found that approximately 90 per cent have Group 2 herbicide resistance. Without testing assume kochia found in Alberta is resistant as well and needs to be controlled with herbicides from a different herbicide group.

Herbicide resistance screening on suspect weeds can be performed by the Saskatchewan Crop Protection Lab (306-787-8130) for a fee, ranging from \$35 to \$100 per sample. Or contact the chemical company or the Alberta Ag-Info Centre toll-free at 310-FARM (3276).

Herbicide Group Classification by Mode of Action

Mode of Action	Chemical family	Active ingredients	Found in*
Group 1			
Inhibitors of acetyl CoA carboxylase (ACCase). These chemicals block an enzyme called ACCase. This enzyme helps the formation of lipids in the roots of grass plants. Without lipids, susceptible weeds die.	Aryloxyphenoxy propionate (Fop)	clodinafop propargyl	Cypress, Foothills, Harmony K, Harmony Max, Harmony SG, Horizon SG, Ladder, MPower Aurora, NextStep SG, NuFarm clodinafop, Signal, Signal D, Signal M, Traxos
		fenoxaprop-p-ethyl	Bengal, Cordon, Puma Super, Puma Advance, Tundra, WildCat, Vigil
		quizalofop-p-ethyl	Assure II, Muster Gold II, Yuma
	Cyclohexanediones (Dim)	clethodim	Arrow 240 EC, Centurion, Select, Shadow RTM
		sethoxydim	Poast Ultra
		tepraloxydim	Equinox, FlaxMax DLX, Odyssey DLX
		tralkoxydim	Achieve Liquid Gold, Liquid Achieve, Titanium, Bison, Marengo
	Phenylpyrazolin (Den)	pinoxaden	Axial, Broadband, Traxos

(continued)

* A herbicide may appear in more than one group if it contains more than one active ingredient.

Herbicide Group Classification by Mode of Action

Mode of Action	Chemical family	Active ingredients	Found in*
Group 2			
ALS/AHAS inhibitors. These chemicals block the normal function of an enzyme called acetolactate (ALS) acetoxyhydroxy acid (AHAS). This enzyme is essential in amino acid (protein) synthesis. Without proteins, plants starve to death.	Imidazolinones	AC 299,263 120 AS	Altitude FX
		imazamethabenz	Assert 300, Assert FL, Avert
		imazamox	Adrenalin SC, Solo, Tensile, Viper
		imazamox + imazethapyr	Absolute, Odyssey, Odyssey DLX
		imazapyr	Arsenal
		imazethapyr	Gladiator, Multistar, Pursuit
	Sulfonylamino-carbonyltriazolinones	flucarbazone sodium	Everest, Pace, Prepare, Prepare Complete
	Sulfonylureas	chlorsulfuron	Telar
		ethametsulfuron methyl	Muster, Muster Gold II
		metsulfuron-methyl	Ally Toss-N-Go, Escort, Accurate, Express Pro, Reclaim
		nicosulfuron	Accent
		rimsulfuron	Prism
		thifensulfuron-methyl	Barricade, Broadside, Deploy, Harmony K, Harmony Max, Harmony SG, Nimble, Refine SG, Retain, Triton C
		tribenuron-methyl	Barricade, Broadside, Deploy, Express Pack, Express SG, Express Pro, FirstStep Complete, Harmony K, Harmony Max, Harmony SG, Nimble, , Nuance, Refine SG, Refine M, Retain, Spike-Up, Triton C, Triton K
		triflussulfuron methyl	UpBeet
	Triazolpyrimidines	florasulam	Assert FL, Benchmark, Broadband, Frontline, Frontline XL, Frontline 2,4-D, PrePass, Spectrum, Stellar
		pyroxulam	Simplicity, Tandem
	Triazolones	thiencarbazone-methyl	Velocity m3
Group 3			
Microtubule assembly inhibitors. These chemicals inhibit the cell division in roots.	Dinitroanilines	ethalfluralin trifluralin	Edge Bonanza, Fortress, Rival, Treflan

(continued)

* A herbicide may appear in more than one group if it contains more than one active ingredient.

Herbicide Group Classification by Mode of Action

Mode of Action	Chemical family	Active ingredients	Found in*
Group 4			
Synthetic auxins. These chemicals disrupt plant cell growth in the newly forming stems and leaves; they affect protein synthesis and normal cell division, leading to malformed growth and tumors.	Benzoic acids	dicamba	Banvel II, Cypress, DyVel, DyVel DSp, Harmony K, Hawkeye Power, Oracle Dicamba, Pulsar, Rustler, Sword, Target, Takkle, Tracker XP, Triton K, Vanquish, VMD 480
	Carboxylic acids	clopyralid	Absolute, Curtail M, Eclipse III, Lontrel, FlaxMax DLX, Prestige, Prestige XC, Spectrum, Tensile
		aminopyralid	Milestone, Reclaim, Restore
		fluroxypyr	Altitude FX, Attain XC, Barricade, Harmony Max, Prestige XC, Pulsar, Retain, Stellar, Tandem, Trophy
		picloram	Grazon, Tordon 22K
		triclopyr	Remedy MSO, Remedy EC
	Phenoxy	2,4-D	2,4-D, Adrenalin SC, Approve, Attain XC, Benchmark, Calmix Pellets, Desormone, Dichlorprop-DX, DyVel DSp, Estaprop XT, Frontline 2,4-D, Grazon, Leader, Restore, Retain, Signal D, Thrasher, Thumper, Titanium, Triton K, Turboprop 600
		dichlorprop (2,4-DP)	Desormone, Dichlorprop-DX, Estaprop XT, Optica Trio, Turboprop 600
		2,4-DB	2,4-DB, Caliber 625, Cobutox 625, Embutox 625
		MCPA	Achieve Liquid Gold, Altitude FX, Assert FL, Badge, Broadside, Buctril M, Clovitox Plus, Curtail M, Cypress, DyVel, FlaxMax DLX, Frontline, Frontline XL, Horizon BTM, Logic M, MCPA, Mextrol, Optica Trio, Prestige XC, Refine M, Signal M, Spectrum, Stellar, Sword, Target, Tracker XP, Topside, Trophy, Tropotox Plus
		MCPB	Clovitox Plus, Topside, Tropotox Plus
		mecoprop (MCP)	Cypress, DyVel DSp, Mecoprop-P, Optica Trio, Sword, Target, Tracker XP
		quinclorac	Triton C

(continued)

* A herbicide may appear in more than one group if it contains more than one active ingredient.

Herbicide Group Classification by Mode of Action

Mode of Action	Chemical family	Active ingredients	Found in*
Group 5			
Photosynthetic inhibitors at Photosystem II, Site A. These chemicals interfere with photosynthesis and disrupt plant growth, ultimately leading to death.	Phenyl carbamates	desmedipham phenmedipham	Betamix, Betamix B Betamix, Betamix B
	Triazines	atrazine simazine	Atrazine, Laddok, Primextra II Magnum Princep Nine-T, Simazine 480
	Triazinones	hexazinone metribuzin pyrazon	Velpar DF, Velpar L Sencor Pyramin
	Uracils	bromacil	Calmix Pellets, Hyvar X/X-L, Krovar I
Group 6			
Photosynthetic inhibitors at Photosystem II, Site II.	Benzthiadiazoles	bentazon	Basagran, Basagran Forte, Laddok, Viper
	Nitriles	bromoxynil	Achieve Liquid Gold, Approve, Badge, Bromotril, Brotex 240, Buctril M, Horizon BTM, Infinity, Koril, Leader, Logic M, Mextrol, Pardner, Signal D, Signal M, Thrasher, Thumper, Titanium, Tundra, Velocity m3
Group 7			
Photosynthetic inhibitors at Photosystem II, Site B.	Ureas	diuron linuron	Diurex 80W, Karmex XP, Krovar I Linuron, Lorox
Group 8			
Lipid synthesis inhibitors (not ACCase inhibition). These chemicals inhibit the cell division and elongation in the seedling shoots before they emerge above ground.	Thiocarbamates	EPTC triallate	Eptam Avadex (Extra Strength) BW/MicroActiv, Fortress
	Pyrazolium	difenzoquat	Avenge 200-C
Group 9			
Inhibitors of EPSP synthesis. These chemicals inhibit the amino-acid synthesis.	None	glyphosate	Cheminova Glyphosate, Clearout 41, Cleanstart, Credit, Credit 45, Eclipse III, Factor 540, FirstStep Complete, Glyphogan Plus, Glyfos, Knockout Extra, Maverick III, MPower glyphosate, NuGlo, Pace, Polaris, Prepare, Prepare Complete, PrePass, Renegade, Roundup Transorb HC, Roundup Ultra2 Roundup WeatherMax, Rustler, R/T 540, Sharpshooter, Sharpshooter Plus, Spike-Up, StartUp, Tackle, Touchdown Total, Traxion, Vantage Plus Max II, Wise Up

(continued)

* A herbicide may appear in more than one group if it contains more than one active ingredient.

Herbicide Group Classification by Mode of Action

Mode of Action	Chemical family	Active ingredients	Found in*
Group 10 Inhibitors of glutamine synthetase.	None	glufosinate ammonium	Liberty 150 SN
Group 11 These chemicals inhibit the carotenoids biosynthesis.	Triazole	amitrole	Amitrol 240
Group 14 Inhibits an enzyme of chlorophyll and heme biosynthesis	Aryl triazone	carfentrazone	Cleanstart
		sulfentrazone	Authority
		safinufenacil	Heat
		flumioxazin	Payload
Group 15 Inhibitors of cell growth and division.	Chloroacetamides	metolachlor propyzamide	Dual II Magnum, Primextra II Magnum Kerb 50W
Group 16 Unknown.	Benzofuranyl alkylsulfonate	ethofumesate	Ethos SC, Nortron
Group 20 Inhibits actively dividing meristems in roots and shoots as well as seed germination	Nitriles	dichlobenil	Casoron
Group 22 Cell membrane disrupters. Chemicals that disrupt the internal cell membrane and prevent the cells from manufacturing food.	Bipyridyliums	diquat	Reglone Desiccant, Reward Gramoxone
		paraquat	
Group 27 Inhibits plant pigment biosynthesis and photosynthesis	Pyrazole	pyrasulfotole	Infinity, Tundra, Velocity m3

* A herbicide may appear in more than one group if it contains more than one active ingredient.

2,4-D



Danger Poison

Group 4

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
2,4-D 600 amine (PCP# 17511)	IPCO	560 g/L	Solution	2 x 10 L
2,4-D 600 amine (PCP# 14726)	Nufarm Agriculture	560 g/L	Solution	2 x 10 L
2,4-D 600 amine (PCP# 5931)	United Agri-Products	560 g/L	Solution	2 x 10 L
2,4-D 600 amine (PCP# 29248)	Viterra	560 g/L	Solution	2 x 10 L
2,4-D 700 ester (PCP# 27819)	IPCO	660 g/L	EC	2 x 10 L, 115 L, 205 L
2,4-D 700 ester (PCP# 27820)	Nufarm Agriculture	660 g/L	EC	2 x 10 L
2,4-D 600 ester (PCP# 27818) Salvo	United Agri-Products	660 g/L	EC	2 x 10 L
2,4-D 700 ester (PCP# 29006)	Viterra	660 g/L	EC	2 x 10 L, 115 L

Crops, Staging and Rates

Crop	Stage	Rate
Wheat, barley, rye (not under-seeded with legumes)	From the 4 - leaf expanded to the early flag-leaf (shot blade) stage.	600 g/L formulation: up to 0.24 - 0.38 L/acre 700 g/L formulation: up to 0.323 L/acre
Winter wheat, fall rye	Spring: full tillering to the shot blade stage. Fall: do not apply to seedling in the fall.	600 g/L formulation: up to 0.24 - 0.38 L/acre 700 g/L formulation: up to 0.33 L/acre
Field corn	As an overall spray, before the corn is 15 cm tall (leaf extended) and/or before the 6-leaf stage. For later applications (corn 15-75 cm, leaf extended), use a shielded spray or a directed spray with drop pipes. Keep spray off corn foliage.	600 g/L formulation: up to 0.19 - 0.37 700 g/L formulation: up to 0.33 L/acre
Established grasses grown for forage and seed production	Spring: up to the shot blade stage of the grass. Fall: after harvest.	600 g/L formulation: up to 0.38 L/acre 700 g/L formulation: up to 0.33 L/acre
Established pasture and rangeland (without legumes)		600 g/L formulation: up to 1.62 L/acre 700 g/L formulation: up to 1.38 L/acre
Stubble land, roadsides, summerfallow	Apply at a time of rapid growth, usually May, June and/or September.	600 g/L formulation: up to 1.11 L/acre 700 g/L formulation: up to 0.95 L/acre
Golf courses (roughs and fairways only), sod farms	Apply at a time of rapid growth, usually May, June and/or September, before grasses are in the flag-leaf (shot blade) stage.	600 g/L formulation: up to 1.1 L/acre 700 g/L formulation: up to 0.77 L/acre (1.53 L per year)
Weeds and brush control (non-crop land)	Apply at time of rapid growth (usually May, June and/or September).	600 g/L formulation: 1.11 - 3.20 L/acre 700 g/L formulation: 1.31 - 2.75 L/acre
Basal bark and stump treatment		700 g/L formulation: 2.5 Litres in 100 L of diesel fuel. Spray to run-off.

Weeds, Rate and Staging

Apply at lower rates when weeds are small (2- to 4-leaf), growing rapidly, under good growing conditions. Higher rates are needed when weeds are larger, growing under stress conditions (dry or cold weather) or in heavy infestation.

2,4-D (cont'd)

Susceptible weeds	Harder-to-control weeds	Very-hard-to-control weeds (top growth only)	Brush species
Apply at: 0.22 - 0.38 L/acre (600 g/L) 0.19 - 0.32 L/acre (700 g/L)	Apply at: 0.40 - 0.61 L/acre (600 g/L) 0.34 - 0.53 L/acre (700 g/L)	Apply at: 0.40 - 0.61 L/acre (600 g/L) 0.45 - 0.53 L/acre (700 g/L)	Apply at: 1.11 - 2.22 L/acre (600 g/L) 1.31 - 2.53 L/acre (700 g/L)
annual sow-thistle ball mustard bluebur (before the 4-leaf stage) burdock (before the 4-leaf stage) cocklebur common plantain common ragweed daisy fleabane false flax false ragweed flixweed* giant ragweed hare's-ear mustard Indian mustard kochia lamb's-quarters narrow-leaved hawk's-beard prickly lettuce pagweed pedroot pigweed Russian pigweed Russian thistle shepherd's-purse stinging nettle stinkweed sweet clover (seeding) thyme-leaved spurge) tumble mustard volunteer canola wild mustard wild radish wild sunflower wormseed mustard	curled dock dog mustard field pepper-grass flixweed** groundsel hairy galinsoga hawkweed heat-all knotweed narrow-leaved hawk's-beard** oak-leaved goosefoot pineapple weed prostrate pigweed purslane sheep sorrel tansy mustard tumble pigweed velvetleaf	biennial wormwood blue lettuce bull thistle burdock buttercup Canada thistle chicory curled dock dandelion field bindweed field chickweed*** field horsetail* gumweed hedge bindweed hemp-nettle*** hoary cress lady's-thumb*** leafy spurge mouse-eared chickweed*** perennial sow-thistle Russian knapweed scentless mayweed smartweed*** tartary buckwheat teasel volunteer sunflower, wild buckwheat*** yellow rocket	alder balsam poplar birch cherry elm hazelnut Manitoba maple sumac trembling aspen poplar western snowberry willow

* Late fall applications or spring seedlings

** Spring: prior to bolting

*** Use highest listed rate for suppression

Tank Mixes

All formulations of 2,4-D may be recommended in tank mix with other products. Consult the label of the tank mix partner product, and follow the most stringent set of precautions, restrictions and directions for use.

Application Information

How to Apply: Ground and aerial applications.

Water Volume: Ground Applications: Barley, corn, rye and wheat: 20 - 40 L per acre. **Established pasture and rangeland:** 40 - 80 L/acre. Non-crop uses: 40 L/acre or more. **Turf:** 40 - 80 L/acre. Lawns and parks, sod farms, and golf courses: 40 - 80 L/acre. **Brush species:** 400 - 800 L/acre.

Aerial Applications: 22 - 66 L/acre. Some formulations of 2,4-D may be applied by air. Check the label for detailed instructions.

Note: Higher application volumes reduced the risk of crop injury.

Application Tips

Recommendations vary from label to label; read label of product used. Do not use on sanfoin, bentgrasses, or freshly seeded grass. Spray during warm weather when the weeds are young and growing actively. Do not spray during periods of high temperatures ($> 27^{\circ}\text{C}$) when crops may be under stress as damage to the crop may occur. Do not spray during periods of high winds when spray is likely to drift. Coarse sprays are less likely to drift.

How it Works

Systemic, non-selective herbicide. Readily absorbed through leaves or roots. Translocated primarily in phloem with the sugars but can also move with water in the xylem. Accumulation is primarily in the young, rapidly growing meristematic regions of roots or shoots. It inhibits pigments, including chlorophyll, leading to death.

Expected Results

Susceptible plants become malformed before they die.

Restrictions

Effect of Rainfall: 2,4-D amine: A rain-free period of 4 hrs is needed after application.

2,4-D ester: A rain-free period of 2 hrs is needed after application.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Do not graze or cut treated crops for forage until 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Re-cropping: No restrictions the year after treatment.

Restricted-entry Interval: Do not enter treated area within 12 hrs after application.

Environmental Precautions

Toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. **Leaching:** The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow. **Runoff:** To reduce runoff from treated areas into aquatic habitats, avoid application to areas with moderate to steep slope, bare soil, compacted soil, or clay.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD_{50} (rats) = technical 300 - 1200 mg/kg. 2,4-D formulations are toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants.

Storage

2,4-D amine requires heated storage. 2,4-D ester may be frozen.

Absolute

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres treated by one case
Odyssey (PCP# 25111)	BASF Canada	Imazamox (35%) + imazethapyr (35%)	Water dispersible granules	4 packs per case: 2 x 86.5 grams Odyssey per pack	40 acres
Lontrel Dry (PCP# 27306)	BASF Canada	Clopyralid (75%)		+ 800 g Lontrel	

Absolute (cont'd)**Crops, Staging and Rates**

Crop	Stage	Rate
CLEARFIELD canola varieties	2 - 6 leaf stage	Odyssey: 17.3 g/acre
		Lontrel Dry: 80 g/acre
		Merge (adjuvant) 0.5% v/v or 0.5 L/100 L spray solution

Note: Merge is not supplied with the Absolute Pack

Weeds and Staging

Grasses: 1 - 4 true leaf stage, up to tillering

Broadleaves: cotyledons to 4 leaf stage

Grasses

barnyard grass
green foxtail

Persian darnel
volunteer barley

volunteer oats
volunteer wheat*

wild oats

Broadleaves

Canada thistle (rosette to
pre bud) (top growth control
6 - 8 weeks)
chickweed
cleavers (up to 4 whorls)

flixweed
hemp-nettle
kochia (suppression)
lamb's-quarters (suppression)
redroot pigweed

Russian thistle
shepherd's-purse
smartweed
stinkweed
stork's-bill

volunteer canola (non
CLEARFIELD varieties)
volunteer tame mustard*
wild buckwheat
wild mustard

* Does not control volunteer CLEARFIELD wheat, CLEARFIELD XCEED

Tank Mixes

None.

Application Information

How to Apply: Ground applications only. Do not apply by air.

Water Volume: 40 L per acre.

Application Tips

Water-soluble bags of Odyssey will dissolve better when kept intact; do not split bags. If agitation is stopped for more than 5 minutes, re-suspend spray solution by full agitation prior to commencing spraying again. Do not spray Absolute, if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Treat CLEARFIELD canola during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of Canada thistle may be severely reduced. Sow thistle plants emerging after spraying will not be controlled.

How it Works

Odyssey is absorbed by foliage and roots and disrupts plant metabolism, causing growth to stop. Lontrel is a systemic hormone-type herbicide. It is absorbed by leaves and stem surfaces and is readily translocated. Maximum efficacy results from foliar applications to young, actively growing plants.

Expected Results

Odyssey: Susceptible weeds may stop growing within 24 - 48 hours. Yellowed growing points, yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days, starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks. Lontrel symptoms on affected plants include swollen growing points and roots, cupping of leaves, twisted and distorted stem. Plants will gradually stop growing and will change colour, first to dark green and then to yellow before turning brown as they die. Maximum effectiveness results from foliar application to young, actively growing plants. Death of weeds may not occur until 14 - 21 days after application. On Canada thistle, some re-growth may occur by the end of the season, but this will not interfere with harvesting of the crop.

Restrictions

Effect of Rainfall: A rain-free period of 6 hrs is needed after application.

Absolute (cont'd)

Grazing: Do not graze treated crops or cut for hay; there are insufficient data to support such use. Apply Absolute only once per year.

Maximum Allowable Applications: Apply Absolute only once per year.

Pre-harvest Interval: 60 days

Re-cropping Restrictions: Barley, CLEARFIELD canola, XCEED canola, corn, spring wheat (including durum), oats, can be grown safely the year following an application. Flax, canary seed, lentils, peas, non-CLEARFIELD canola and sunflower can be grown in the second year after an Absolute application (e.g. if Absolute was applied in 2008 then non-CLEARFIELD canola can be planted in 2010). For other crops, call BASF at 1-877-371-2273. Conduct a field bioassay (a test strip grown to maturity) the year before growing any crops other than those listed above. In case of crop failure, replant to CLEARFIELD canola or CLEARFIELD wheat only.

Environmental Precautions

Absolute is highly toxic to non-target plants. Leave a buffer zone of at least 14 m between the downwind point of direct application and the closest edge of sensitive terrestrial and aquatic habitats. To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Toxicity

Odyssey: low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg. Not toxic to birds, fish or beneficial insects such as bees. **Lontrel:** very low acute mammalian toxicity. Acute oral LC₅₀ (rats) = >2,000 mg/kg. Acute oral LD₅₀ (bees) 100 µg/bees. Extremely low toxicity to fish.

Storage

Store at temperatures above 5°C. Keep unused water-soluble bags in resealed, original containers. Keep package dry at all times, Store away from food, feed stuff, fertilizer and pesticide.

Accent

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres treated by one pouch
Accent (PCP# 25116)	E.I. duPont Canada	Nicosulfuron (75%)	Water dispersible granules	133.6 gram (4 x 33.4 g water soluble bags)	10 acres

Crops, Staging and Rates

Crop	Stage	Rate
Field corn	1 - 8 leaves* (6 visible collars)	13.5 g/acre plus 0.2% v/v non-ionic surfactant (Citowett Plus, Agral 90 or Ag-Surf)
Sweet corn**	1 - 6 leaves* (4 visible collars)	

* The coleoptile (short, blunt leaf) is counted as the first leaf.

** Accent is registered on all sweet corn varieties; however, tolerance may vary depending on variety. Refer to seed supplier for variety tolerance.

Weeds and Staging

Weeds	Staging
barnyard grass fall panicum	1 - 6 leaves (up to 2 tillers)
green foxtail/	1 - 6 leaves (up to 2 tillers)

Accent (cont'd)

Weeds	Staging
old witchgrass	1 - 6 leaves (up to 2 tillers)
quackgrass	3 - 6 leaf stage (10 to 20 cm in height - leaf extended)
wild oats	3 - 6 leaves
yellow foxtail (suppression)	1 - 6 leaves (up to 2 tillers)

* Does not control volunteer CLEARFIELD wheat.

Tank Mixes

Accent (13.5 g/acre) + Banvel II (0.24 L/acre) + 0.2% v/v non-ionic surfactant (Citowett Plus, Agral 90 or Ag-Surf).

Accent (13.5 g/acre) + Pardner (0.4 L/acre) + 0.2% v/v non-ionic surfactant (Citowett Plus, Agral 90 or Ag-Surf).

Application Information

How to Apply: Ground applications only. **Do not apply by air.**

Water Volume: 40 L per acre.

Application Tips

Warm, moist conditions following application promote the activity of Accent, while cool and/or dry conditions may reduce or delay activity. Poor weed control or crop injury may result from applications made to plants under stress from abnormally hot or cold weather, environmental conditions such as drought, water-saturated soils, hail damage or frost, disease, insect or nematode injury and prior herbicide, or carryover from a previous year's herbicide application. Delay application until stress passes and both weeds and corn resume growth. If corn has been injured by frost, wait 48-72 hours before applying Accent. Severe stress conditions immediately following application may also result in crop injury or poor weed control. Do not apply a foliar organophosphorus insecticide within 7 days before or after applying Accent.

How it Works

Accent is a systemic herbicide that is absorbed by the foliage and translocated to the growing points of the plant. Growth of susceptible plants stops shortly after application. Accent rapidly stops the growth of susceptible species; typical symptoms usually appear within 5 - 7 days, but may not be noticeable for 2 - 3 weeks after application, depending on the prevailing growing conditions.

Expected Results

Typical injury symptoms include yellowing, purpling and reddening of the newest leaves and usually appear within 5 - 7 days, but may not be noticeable for 2 - 3 weeks after application, depending upon the prevailing growing conditions. Eventually the entire plant discolours and dies.

Restrictions

Rainfall: A rain-free period of 2- 4 hrs is needed after application.

Grazing: Do not graze treated crops or cut for hay.

Pre-harvest Interval: Do not harvest field corn until 30 days and sweet corn for 40 days after application.

Re-cropping Restrictions: Winter wheat may be seeded 4 months after application. Barley, corn, spring wheat, white beans, red clover and alfalfa may be seeded one year after application. For all other crops a field bioassay is recommended before planting. Do not plant canola for 22 months following application. For all other crops including sugarbeets, a field bioassay is recommended before planting. Do not plant sugarbeet until a field bioassay indicates it is safe to do so.

Environmental Precautions

Accent is toxic to terrestrial plants and aquatic organisms. Leave a buffer zone of at least 14 m between the downwind point of direct application and the closest edge of sensitive terrestrial and aquatic habitats.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg.

Storage

Store in a dry place. Keep water-soluble bags in original outer container or bag away from moisture.

Achieve (Liquid Achieve SC)/ Bison 400L/Marengo

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Liquid Achieve SC (PCP# 28555)	Dow AgroSciences	400 g/L tralkoxydim	Suspension concentrate	2 x 8L or 96L
Bison 400L (PCP# 29256)	MANA Canada	400 g/L tralkoxydim + adjuvant	Suspension concentrate	8L + 8L addit, 96 L
Marengo (PCP# 29289)	Viterra	400 g/L tralkoxydim	Suspension concentrate	1 x 8 L Marengo + 1 x 4 L Turbocharge

One case will treat 40 acres.

Crops and Staging

No staging restrictions

barley (all 2 or 6 rows) (8.9)
spring wheat (all varieties) (8.9)
durum wheat (all varieties) (8.9)

winter wheat all varieties (8.9)
spring rye
fall rye

triticale

Underseeded crops

Apply at 2 - 4 leaf stage of the forage legumes and grasses

Cereal crops underseeded to forage legumes (if not tank-mixed with broadleaf herbicides)

alfalfa bird's-foot trefoil clover sainfoin

Forage grasses underseeded to cereals or grown alone

crested wheatgrass intermediate wheatgrass creeping red fescue meadow and smooth brome grass (seed production)

Weeds Controlled, Staging and Rates

Weeds	Stage
barnyard grass persian darnell	1 - 4 leaf
green foxtail yellow foxtail	1 - 5 leaf
volunteer oats wild oats	1 - 6 leaf

Rate

200 mL per acre of Liquid Achieve/Bison 400L/Marengo. Add Turbocharge at a rate of 0.5% v/v or 0.5 L per 100 L spray solution. When water analysis indicates bicarbonates levels are 400 ppm or greater, add ammonium sulfate at 0.75 - 1.5 kg/100 L (7.5 - 15 lb/100 gallons) of spray water prior to mixing.

Tank Mixes

For all tank mixes, use 0.2 litres Achieve SC/Bison 400L/Marengo plus the following:

Tank-mix partner	Product rates	Crop stage
2,4-D ester	400 m L/acre (600 g/L formulation)	Prior to the 4 leaf stage of the crop

Achieve (Liquid Achieve SC)/Bison 400L/Marengo (cont'd)

Tank-mix partner	Product rates	Crop stage
Attain XC	Attain XC A: 95 - 130 mL/acre + Attain XC B: 260 - 340 mL/acre	Prior to the 4 leaf stage of the crop
Buctril M	400 mL/acre	Apply between 2 leaf to early flag leaf
Curtail M	810 mL/acre	Apply between 3 leaf to early flag leaf
Dichlorprop plus 2,4-D ester	710 mL/acre	Prior to 4 leaf stage of the crop
Lontrel + MCPA ester	Lontrel: 110mL/acre + MCPA ester 500: 450 mL/acre	Apply between 3 leaf expanded to flag leaf
MCPA ester 500	450 mL/acre	Apply between 3 leaf to early flag leaf
Mextrol 450 M	450 mL/acre	Spring wheat (including durum) and barley: 2 leaf to early flag leaf
Mextrol 400	560 mL/acre	
Prestige XC	Prestige XC A: 130 - 170 mL/acre + Prestige XC B: 600 - 800 mL/acre	Spring wheat and barley: 3 leaf to early flag leaf
Trophy	Trophy A: 240 mL/acre + 450 mL/acre	Spring wheat (including durum) and barley: 3 leaf to early flag leaf
Thumper	400 mL/acre	Spring wheat (including durum) and barley: 4 leaf to early flag leaf
Decis Flowable (insecticide)	63 - 83 mL/acre	Spring wheat (including durum) and barley: 3 leaf to early flag leaf

Note: Do not tank mix with 2,4-D amine or MCPA amine formulation or with any other herbicide, insecticide, fungicide, fertilizer solution or adjuvant not recommended on the label as poor grass control and/or unacceptable crop injury may result.

Do not tank mix Liquid Achieve SC/Bison 400L/Marengo with broadleaf herbicides when applying to cereal crops underseeded to forage legumes as the forages may be injured or killed.

With reduced water volumes, tank mixes with Buctril M, Thumper or Pardner may result in some initial injury in the form of "tip burn." This injury, however, will not have any adverse effect on crop maturity or yield.

Tank mixes with Attain or Prestige may cause temporary crop injury if applied before the 4-leaf stage. These tank mixes may provide a lower level of wild oat control than Achieve SC/Bison 400L/Marengo alone.

Tank mixes with 2,4-D ester/dichlorprop and Buctril M plus MCPA may cause some injury in barley.

Application Information

How to Apply: Ground and aerial applications.

Water Volume: Ground: 20 - 40 L/acre. Air: 12 - 18 L/acre.

Application Tips

Weed Control: Optimum weed control is obtained by applying herbicides when targeted weeds are actively growing. Applying herbicides under stressful conditions (drought, heat, frost, poor soil fertility, flooding or prolonged cool temperature) may delay or reduce weed control.

Crop safety: Applications of Achieve SC/Bison 400L/Marengo to non-tillered crops exposed to 4°C temperatures before or after spraying should be avoided to prevent the possibility of crop injury. Tillered cereal crops may incur injury if Achieve SC is sprayed within 48 hours of freezing temperatures.

Sequential applications: Always apply Liquid Achieve SC/Bison 400L/Marengo first and allow 5 - 7 days before applying any other non-registered tank mix herbicide. This is especially critical for Group 2 herbicides.

How it Works

Tralkoxydim is a systemic herbicide that is absorbed through the leaves and translocated to the growing points within the plant where it inhibits an enzyme involved in lipid biosynthesis. Thorough coverage of the foliage is important for consistent grass control.

Expected Results

Grass growth stops in 48 hours. Young shoots turn brown in 7 - 8 days. Complete death of plant will take 2 - 3 weeks.

Restrictions

Rainfall: No effect 1 hour after application.

Grazing: Immature cereal crops may be grazed, harvested or cut for hay 16 days after treatment. Mature straw may be fed to livestock. Do not feed or graze underseeded forage crops in the year of treatment.

Pre-harvest Interval: Immature cereal crops may be grazed or cut for hay 16 days after treatment. Grain may be harvested 60 days after treatment. Mature straw may be fed to livestock. Do not feed or graze underseeded forage crops in the year of treatment; sufficient data are not available to support this use.

Re-cropping Restrictions: Do not replant treated areas to tame oats or corn for at least 4 weeks after application. Other Crops: none.

Environmental Precautions

Do not apply to any body of water. Avoid drifting of spray onto any body of water or other non-target. Do not apply within 15 m by ground and (50 m by air) of non-crop areas. This includes fish-bearing waters, wetlands (potholes, sloughs etc.) and wildlife habitat (hedgerows, rights of way, etc.).

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg.

Storage

Store in a cool, dry place. Keep packages dry at all times. Product is not affected by freezing.



Warning Poison

Achieve Liquid Gold

Group 1, 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Achieve SC (PCP# 27011)	Nufarm Agriculture Inc.	400 g/L tralkoxydim	Suspension concentrate	4L, 90L
Mextrol 450 (PCP# 26999)	Nufarm Agriculture Inc.	225 g/L bromoxynil + 225 g/L MCPA ester	EC	10L, 112.5L
Turbocharge (PCP# 23135)	Nufarm Agriculture Inc.	50% mineral oil + 40% surfactant blend		4L, 90L

One small package will treat 20 acres. One bulk package will treat 450 acres.

Crops and Staging

Wheat (including durum) and barley: 2 - leaf to early flag leaf; winter wheat, fall rye: from the time growth commences to early flag leaf.

barley (all 2 or 6 rows)
durum wheat (all varieties)

fall rye
spring rye

spring wheat (all varieties)
winter wheat all varieties

Weeds Controlled and Staging

Grasses		
1 - 4 leaf stage	1 - 5 leaf stage	1 - 6 leaf stage
barnyard grass persian damel	green foxtail yellow foxtail	volunteer oats wild oats

Achieve Liquid Gold (cont'd)

Broadleaves		
Seedlings up to 4 leaf stage	Seedlings up to 8 leaf stage	Perennial: top growth control
American nightshade Ball mustard bluebur cocklebur cow cockle*) flixweed) green smartweed kochia** lady's-thumb night flowering catchfly pale smartweed redroot pigweed Russian thistle** scentless chamomile*** shepherd's-purse stinkweed velvetleaf**** volunteer rapeseed volunteer sunflower	common buckwheat common groundsel common ragweed lamb's-quarters stinkweed tartary buckwheat wild buckwheat wild mustard wormseed mustard	Canada thistle perennial sow-thistle

* In normal conditions cow cockle will be controlled up to the 4-leaf stage. Plants beyond this stage are unlikely to be controlled.

** Spray before plants are 5 cm high.

*** Spring annuals only.

**** Spray before plants are 8 cm high.

Rate

Achieve Liquid SC: 0.2 L/acre. **Mextrol 450:** 0.5 L/acre. **Turbocharge adjuvant:** 0.5% v/v or 0.5 L per 100 L spray solution. One case of Achieve Liquid Gold will treat 20 acres.

When water analysis indicates bicarbonates levels are 400 ppm or greater, add ammonium sulfate at 0.75 - 1.5 kg/100 L (7.5 - 15 lb/100 gallons) of spray water prior to mixing.

Tank Mixes

Tank-mix partner	Product rates	Remarks
MCPA ester	0.22 L/acre (500 g/L formulation)	A reduction in green foxtail control may occur with this tank mix
Decis	Label rates	
Matador		

Application Information

How to Apply: Ground and aerial applications.

Water Volume: Ground application: 20 - 40 L/acre. Aerial application: 12 - 18 L/acre.

Application Tips

Weed Control: Optimum weed control is obtained by applying herbicides when targeted weeds are actively growing. Applying herbicides under stressful conditions (drought, heat, frost, poor soil fertility, flooding or prolonged cool temperature) may delay or reduce weed control.

Crop safety: Applications of Achieve Liquid Gold to non-tillered crops exposed to 4°C temperatures before or after spraying should be avoided to prevent the possibility of crop injury. Tillered cereal crops may incur injury if Achieve Liquid Gold is sprayed within 48 hours of freezing temperatures.

How it Works

Achieve is a systemic herbicide that is absorbed through the leaves and translocated to the growing points within the plant where it starts killing the susceptible grasses. Thorough coverage of the foliage is important for consistent grass control. Mextrol 450 contains two components, bromoxynil and MCPA. Bromoxynil is a contact herbicide inhibiting

respiration and photosynthesis of the susceptible weeds. MCPA is a systemic herbicide absorbed through foliage and roots and is readily translocated to the actively growing regions of the plant.

Expected Results

Grassy weeds: growth stops in 48 hours. Young shoots turn brown in 7 - 8 days. Complete death of plant will take 2 - 3 weeks. Broadleaf weeds: small burnt spots on the leaf can appear within hours; death takes up to two weeks. Poor results may be expected as a result of poor coverage or poor penetration through canopy.

Restrictions:

Rainfall: No effect 1 hour after application.

Grazing: Immature cereal crops may be grazed, harvested or cut for hay 16 days after treatment. Mature straw may be fed to livestock. Do not feed or graze underseeded forage crops in the year of treatment.

Pre-harvest Interval: Immature cereal crops may be grazed or cut for hay 16 days after treatment. Grain may be harvested 60 days after treatment. Mature straw may be fed to livestock. Do not feed or graze underseeded forage crops in the year of treatment, sufficient data are not available to support this use.

Re-cropping Restrictions: Do not replant treated areas to tame oats or corn for at least 4 weeks after application. Other Crops: none.

Environmental Precautions

Do not apply to any body of water. Avoid drifting of spray onto any body of water or other non-target. Do not apply within 15 m by ground and (50 m by air) of non-crop areas. This includes fish-bearing waters, wetlands (potholes, sloughs etc.) and wildlife habitat (hedgerows, rights of way, etc.).

Toxicity

Achieve Liquid: very low acute mammalian toxicity. Acute oral LD_{50} (rats) = 2,950 mg/kg. Acute dermal LD_{50} (rats) = >5,000 mg/kg.

Mextrol 450: high acute mammalian toxicity. Acute oral LD_{50} (rats) = 365 mg/kg. Very toxic to birds and fish. Non-toxic to bees. May cause burns and may be absorbed through the skin.

Storage

Store in a cool, dry place, away from children, animals, food, feed or fertilizers. Keep unused product in resealed original container. Store above -5°C. Shake well before reuse.

Adrenalin SC

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Adrenalin SC (PCP# 27879)	BASF Canada	Imazamox (20 g/L) + 2,4-D (600 g/L)	Emulsifiable concentrate	2 x 8 L jugs

Crops and Staging

Apply only to CLEARFIELD wheat (wheat varieties with the CLEARFIELD trait). Application should be made from the 4th leaf up to and including the 6 leaf stage of CLEARFIELD wheat prior to flag leaf emergence.

Note: Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury may occur as a result of spray overlap. **Avoid sprayer overlap.**

Weeds Controlled and Staging

Grasses: 1 - 4 leaf stage up until early tillering (maximum of two tillers)

Broadleaves: Cotyledons to 4 leaf stage

Adrenalin SC (cont'd)

Grasses			
barnyard grass green foxtail persian damel	volunteer barley volunteer canaryseed volunteer durum wheat	volunteer tame oats volunteer wheat (non-imazamox tolerant)	wild oats yellow foxtail
Broadleaves			
annual smartweed annual sow-thistle bluebur cocklebur cow cockle daisy fleabane false flax flixweed	goat's-beard kochia lamb's-quarters mustards (except dog and tansy) narrow-leaved hawk's-beard plantain prickly lettuce	ragweed redroot pigweed Russian thistle shepherd's-purse stinging nettle stinkweed sweet clover thyme-leaved spurge	volunteer canola (including all HT varieties) wild buckwheat wild radish wild sunflower
Suppression			
biennial wormwood blue lettuce bull thistle* burdock* buttercup* Canada thistle* chickweed cleavers common groundsel	curled dock (young) dandelion field bindweed* gumweed hawkweed heal-all hedge bindweed hemp-nettle hoary cress*	horsetail Japanese brome grass knotweed leafy spurge mustard (dog and tansy) oak-leaved goosefoot peppergrass perennial sow-thistle* pineappleweed	prostrate pigweed purslane Russian knapweed sheep sorrel tartary buckwheat* tumble pigweed velvetleaf yellow rocket

*Top growth control only

Rates**Adrenalin SC:** 0.4 L/acre.

Non-ionic surfactant (e.g., Agral 90, Ag Surf or Surf 92): 0.25% v/v or 0.25 L per 100 L of spray solution. Surfactant is not included in the Adrenalin SC case.

Tank Mixes

None.

Application Information**How to Apply:** Ground applications only. **Do not apply by air.****Water Volume:** Ground: 40 L/acre.**Application tips**

Crop safety: Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury may occur as a result of spray overlap. Avoid sprayer overlap. If application of Adrenalin SC is early (prior to 3 leaf stage), there may be 2,4-D damage. Application prior to the 3-leaf stage of wheat may cause severe twisting of leaves and leaf stem and head deformities, which may reduce yield. Do not spray Adrenalin SC if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing.

Weed Control: Treat CLEARFIELD wheat during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced. Application must be made before crop canopy shields the weeds.

How it Works

Absorbed by foliage and roots. Disrupts plant metabolism causing growth to stop. Works best under good growing conditions.

Expected Results

Grassy weeds will stop growing within 24 hours of application. After 7 - 10 days, symptoms start occurring. There

is a definite yellowing of the growing point; interveinal chlorosis and newest leaves are noticeably affected by yellowing. Death occurs for grassy weeds in 14 - 21 days. Broadleaf weeds stop growing within 24 hours and weed activity stops within 1 - 5 days. There will be a twisting of the growing point (result of the 2,4-D component) and yellowing of the growing point (result of the imazamox).

Restrictions

Rainfall: Do not apply Adrenalin SC if heavy rain is forecast.

Grazing: Do not graze the treated crop within 14 days of application or cut for hay within 42 days of application.

Pre-harvest Interval: Wheat grain and straw can be harvested 79 days after treatment.

Restricted-entry interval: 12 hours.

Re-cropping Restrictions: Spring wheat (including durum), spring barley, canaryseed, corn, chickpeas, field peas, canola (all varieties), lentils, oats and flax can be grown safely the year following an application. Mustard (condiment type only) may be grown safely the second season after application. There are insufficient data for following with other crops. Conduct a field bioassay (a test strip grown to maturity) the year before growing any crops other than those listed above.

Environmental Precautions

Toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. Avoid situations that may result in drift. Leave 11 metres from the point of direct application and the closest downwind edge of sensitive terrestrial habitats (such as grasslands, forested areas, shelter belts, woodlots, hedgerows, pastures, rangelands, and shrublands) and sensitive aquatic habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs, and wetlands). Do not spray exposed roots of trees and ornamentals.

Leaching: The use of Adrenalin SC may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a strip of untreated vegetation between the treated area and the edge of the water body.

Toxicity

Imazamox: Low acute mammalian toxicity. The LD₅₀ (oral) for Adrenalin SC is >500 to <2,000 mg/kg.

Storage

Store above 5°C. Store in a cool, dry place away from children, animals, food, feed or fertilizers.

Keep from freezing.



Caution Poison

Ally Toss-N-Go/Accurate

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Ally Toss-N-Go (PCP# 24388)	E.I. duPont Canada	Metsulfuron methyl (60%)	Water dispersible granules	122 g package: (4 x 30.5) water soluble bags
Accurate (PCP# 29242)	Cheminova	Metsulfuron methyl (60%)	Water dispersable granules	120 gm package

One 122 g package will treat 40 - 60 acres.

Crops and Staging

Crop	Rate	Stage
Barley	Up to 3 g/acre + non-ionic surfactant	2 leaf to the emergence of the flag leaf
Spring wheat (including durum)		

Ally Toss-N-Go/Accurate (cont'd)

Crop	Rate	Stage
Forage grasses for forage or seed production		
Creeping red fescue	Up to 3 g/acre + non-ionic surfactant	2 leaf to the emergence of the flag leaf
Orchard grass		
Wheatgrass (crested and intermediate)		
Pasture and rangeland		
	10 - 12 g/ acre + non-ionic surfactant	

Weeds Controlled and Staging

Weeds must be actively growing at the time of application, unless otherwise indicated.

Ally/Accurate 3 grams/acre + non-ionic surfactant

ball mustard	hemp-nettle	scentless chamomile	tartary buckwheat
bluebur	kochia*	shepherd's-purse	toadflax (suppression)
Canada thistle (suppression)**	lady's-thumb	sow thistle (annual)	volunteer canola (excluding
chickweed*	lamb's-quarters	(suppression)**	CLEARFIELD canola
common groundsel	(suppression)****	sow thistle (perennial)	wild buckwheat
corn spurry	prostrate pigweed	(suppression)**	(suppression)***
cow cockle	redroot pigweed	stinkweed	wild mustard
flixweed	Russian thistle (suppression)****	stork's-bill	
green smartweed			

* Excluding Group 2 resistant populations.

** Before the thistle are more than 15 cm tall.

*** Cotyledon to 3-leaf stage.

**** Before these weeds are more than 8 cm tall.

Ally/Accurate 2 grams/acre + 2,4-D (amine or ester) + non-ionic surfactant

annual sunflower	green smartweed	redroot pigweed	tartary buckwheat*
ball mustard	hemp-nettle	Russian pigweed	toadflax (suppression)
bluebur*	kochia	Russian thistle	volunteer canola (including
Canada thistle (suppression)	lady's-thumb*	scentless chamomile*	CLEARFIELD varieties)
chickweed	lamb's-quarters	shepherd's-purse	wild mustard
common groundsel*	narrow-leaved hawks-beard**	sow thistle (suppression)	wild buckwheat (suppression)
corn spurry*	plantain	stinkweed	wormseed mustard
Cow cockle	prickly lettuce	stork's bill*	
flixweed	prostrate pigweed*	sweetclover	

* Weeds controlled only when Ally + 2,4-D mixture contains Ally Toss-N-Go at 3.0 grams/acre.

** Spring seedling only.

Ally/Accurate 2 grams/acre + MCPA (amine or ester) + non-ionic surfactant

annual sunflower	green smartweed	Russian pigweed	toadflax (suppression)
ball mustard	hemp-nettle	Russian thistle	tumble mustard
bluebur*	kochia	scentless chamomile*	volunteer canola (including
Canada thistle (suppression)	lady's-thumb*	shepherd's-purse	CLEARFIELD varieties)
chickweed	lamb's-quarters	sow thistle (suppression)	wild buckwheat (suppression)
common groundsel*	plantain	stinkweed	wild mustard
corn spurry*	prickly lettuce	stork's bill*	wormseed mustard
cow cockle	prostrate pigweed*	sweetclover	
flixweed	redroot pigweed	tartary buckwheat*	

* Weeds controlled only when Ally/Accurate + MCPA mixture contains Ally Toss-N-Go/Accurate at 3.0 grams/acre.

** Spring seedling only.

Rate

Cereals and forage grasses (for forage or seed production) - up to 3 grams/acre plus recommended surfactant (Agral 90, AgSurf or Citowett Plus, Companion, Super Spreader - Stricker) at 0.2 L/100 L of spray solution.

Pasture and rangeland: Western snowberry: 10 grams/acre. **Wild rose:** 12 grams/acre. Add a recommended surfactant (Agral 90, AgSurf or Citowett Plus, Companion, Super Spreader - Stricker) at 0.2 L/100 L of spray solution.

Tank Mixes

Tank-mix partners	Product rate	Crop stage	Remarks
In spring wheat (including durum) and barley			
2,4-D 600 ester or amine 500	0.28 - 0.36 L/acre (ester) 0.34 - 0.45 L/acre (amine)	Full 3 leaf to just before flag leaf	Add recommended non-ionic surfactant
MCPA 500 amine or ester	0.28 - 0.45 L/acre	2 - 6 leaf (shot blade)	No surfactant is required
Avenge	1.7 L/acre		
Avenge + MCPA ester	1.7 L/acre + 0.28 + 0.45 L/acre		
Spring wheat (including durum)			
Puma TM Super	0.15 - 0.31 L/acre	1 leaf to 6 leaf (main stem) + 3 tillers	No surfactant is required
Spring wheat only			
Horizon + Score adjuvant	92 - 117 mL/acre	2 leaf to flag leaf	Add Score adjuvant at 0.8 - 1.0 % v/v
Established creeping red fescue for seed			
Assure II+ Score /Sure Mix adjuvant	0.24 - 0.3 L/acre	2 leaf to flag leaf	Add Score at 0.5% v/v

Application Information

How to Apply: Ground applications only. **Do not apply by air.**

Water Volume: Cereal and forage grasses: 40 L/acre. Pasture and rangeland: 40 - 91 L/acre.

Application Tips

Effectiveness may be reduced if spray mixture remained in tank for more than 48 hrs. Warm, moist growing conditions promote active weed growth and enhance the activity of Ally/Accurate, allowing maximum foliar uptake and contact activity. If cold, dry conditions prevail, delay treatment until active weed growth resumes. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur.

How it Works

Ally/Accurate is absorbed by the foliage and roots, readily translocated throughout the plant and inhibits the cell division.

Expected Results

Ally/Accurate rapidly inhibits the growth of susceptible weeds; however, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 to 3 weeks after application depending upon growing conditions and weed susceptibility. Degree of control and duration of effect depend on weed sensitivity, weed size, growing conditions, soil pH and spray coverage.

Restrictions

Rainfall: Heavy rainfall immediately before or after application may cause temporary lightening of crop. Rainfall within 2 - 4 hours of application may lessen degree of weed control.

Grazing: Wheat, barley or forage crops may be grazed by or fed to livestock any time after treatment.

Re-cropping Restrictions: Do not use on soils with pH greater than 7.9. Do not apply to irrigated land where tail water will be used to irrigate other cropland.

Crops for rotation	Soil pH	Minimum cropping interval* (months)	
		Black and Gray Wooded soils	Brown and Dark Brown soils
Alfalfa, peas and red clover	7.5 or lower	22	Field bioassay
Spring wheat, barley and durum wheat	7.9 or lower	10	10

Ally Toss-N-Go/Accurate (cont'd)

Crops for rotation	Soil pH	Minimum cropping interval* (months)	
		Black and Gray Wooded soils	Brown and Dark Brown soils
Canary seed	7.9 or lower	48	48
Canola	6.9 or lower	10	22
	7.0 - 7.9	22	34
Flax	6.9 or lower	10	22
	7.0 - 7.9	34	34
Fescue	7.5 or lower	10	Field bioassay
Lentils	6.9 or lower	34	34
	7.0 - 7.9	48	48
Oats	6.9 or lower	10	10
	7.0 - 7.9	10	22
Yellow mustard	7.9 or lower	48	48
All other crops	7.9 or lower	Field bioassay	Field bioassay

* If land has been treated with Ally/Accurate and Assert the same year or in successive years, seed only wheat, excluding durum, until a field bioassay demonstrates that other crops can be seeded. When recropping to broadleaf crops following an Ally application, extend the rotational interval by 1 year if rainfall was less than 130 mm in the Brown and Dark Brown Soil Zones or 250 mm in the Black and Grey Wooded Soil Zones in any year within the stated interval prior to planting.

Environmental Precautions

Highly toxic to non-target plants. Over spray or drift to important wildlife habitats such as shelterbelts, wetlands, sloughs or dry slough borders and woodlots should be avoided. Leave a 15-metre zone between the last spray swath and the edge of any of these habitats. Do not use on highly variable soils that have large gravelly or sandy areas, eroded knolls, or calcium deposits. Do not apply to irrigated land where tail water will be used to irrigate other cropland. Do not contaminate irrigation water. Do not apply within 15 metres of a body of water.

Runoff: Do not apply to frozen ground where surface runoff may occur.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg.

Storage

Store in a cool, dry place.

Altitude FX

Caution Irritant Danger Poison

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres treated by one package
AC 299,263,120 AS (PCP# 26705)	BASF Canada	120g/L of imazamox	Solution	1.34 L	20 acres
Starane (PCP# 24815)	BASF Canada	180 g/L of fluroxypyr	EC	4.8 L	
MCPA ester 600 (PCP# 27802)	BASF Canada	600 g/L of MCPA ester	EC	7.5 L	

Crops and Staging

CLEARFIELD wheat varieties only. Apply at 3-leaf (after appearance of first tiller) to a 6-leaf stage to ensure optimum crop tolerance.

Weeds and Staging

Grasses: 1-4 true leaf stage up until early tillering (maximum 2 tillers).

Broadleaf weeds: Apply up to 4-leaf stage, unless otherwise indicated.

Grasses	
barnyard grass green foxtail Japanese brome* persian damel volunteer barley	volunteer canaryseed volunteer wheat (durum and spring) - non CLEARFIELD volunteer tame oats wild oats yellow foxtail

* Suppression

Broadleaves			
annual sunflower chickweed cleavers (1-4 whorl) cocklebur common burdock common ragweed cow cockle	cow cockle flixweed green smartweed* hemp-nettle (2-6 leaf) kochia (incl. group 2 resistant biotype) round-leaf mallow*	lamb's-quarters mustard (except dog and tansy) prickly lettuce red root pigweed Russian thistle* shepherd's-purse stinkweed	stork's-bill (1-8 leaf)* vetch volunteer canola (all varieties) volunteer flax (1 - 12 cm) wild buck wheat wild radish

* Suppression

Rates

Product	Rate	Remarks
AC 299,263,120 AS	67 mL/acre	Note: Surfactant not included with Altitude FX
Starane	0.24 L/acre	
MCPA ester 600	0.38L/acre	
Non-ionic surfactant (Agris 90, Ag Surf or Surf 92)	0.25% v/v of spray solution or 0.25 L per 100 L of spray solution.	

Tank Mixes

None registered.

Application Information

How to Apply: Ground applications only. **Do not apply by air.**

Water Volume: 20 - 40 L/acre.

Application Tips

Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury will occur as a result of spray overlap. Avoid sprayer overlap.

Do not spray Altitude FX if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Do not apply more than once per year. For best results, treat CLEARFIELD wheat during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth.

How it Works

Absorbed through the foliage and roots. Disrupts plant metabolism causing growth to stop within 24 hours. Visible symptoms appear within 7-10 days and, depending on environmental conditions, weed death occurs within 14-21 days after application.

Altitude FX (cont'd)**Restrictions**

Rainfall: Do not apply when heavy rain is forecast.

Grazing: Do not graze or silage the treated crop within 14 days of application or cut for hay within 42 days of application.

Pre-harvest Interval: Wheat grain and straw can be harvested 79 days after treatment.

Re-cropping: The following crops may be grown safely the year following an application: field peas, field corn, canary seed, CLEARFIELD canola, non-CLEARFIELD canola, lentils, spring wheat, durum wheat, spring barley, sunflower, tame oats, flax, chickpea. The following crop may be grown safely two years following an application: mustard (condiment type only). There are insufficient data for other following crops. Conduct a field bioassay (a test strip grown to maturity) the year before growing any crop other than those listed above.

Environmental Precautions

These products are highly toxic to non-target plants. Avoid situations where drift may occur. Leave a 15-metre buffer zone between sprayed and sensitive areas such as ponds, wetlands, streams, woodlots and shelterbelts. AC 299,263,120 AS contains a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning of equipment.

Toxicity

AC 299,263,120 AS: Low mammalian toxicity. Acute oral LD₅₀ (rats) = 5,000 mg/kg. Starane: has a low mammalian toxicity. Acute oral LD₅₀ (rats) = 3,738 mg/kg. MCPA ester 600: moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 1,046 mg/kg. This product contains a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application.

Storage

Store above 5°C. Store in a cool, dry place away from children, animals, food, feed or fertilizers. Keep from freezing.



Caution Poison

Amitrol 240

Group 11

Formulations

Product	Company	Active ingredient	Formulation	Container size
Amitrol (PCP# 25684)	Nufarm Agriculture Inc.	Amitrol	231 g/L	10 L

Crops, Rate and Staging

Crops	Rate	Weeds controlled	Day to plant
Pre-seed: wheat, barley, canola*	1.7 L/acre	dandelion, annual weeds	0 - 1
Pre-seed: corn and soybeans	3.3 - 6.7 L/acre	quackgrass, canada thistle, broadleaf and annual weeds	10 - 14 days
Pre-seed: white beans		dandelion, annual weeds	

Crops	Rate	Weeds controlled	Day to plant
Pre-seed: field peas	1.7 L/acre	dandelion, annual weeds	5 - 7
Post harvest	5.0 - 6.6 L/acre	Canada thistle, perennial sow-thistle	
Alfalfa/clover renovation	1.7 - 3.4 L/acre	alfalfa, dandelion, annual weeds	
Established shelterbelts	7.6 - 11.3	Canada thistle, cattails, dandelions, hoary cress, field horsetail, leafy spurge, milkweed, perennial sow thistle, poison ivy, quackgrass, toadflax	
Spot treatments for pasture and non-crop land	0.165 L in 25 L of water to treat 10 x 10 m. area		

* The Canola Council of Canada recommends that Amitrol 240 not be used prior to canola grown for export market.

Weeds, Rate and Staging

Prior to seeding: Dandelion and annual weeds - apply 1.7 L/acre to actively growing weeds less than 10 cm tall. Do not cultivate for 10 - 14 days.

Post-harvest: Canada thistle, perennial sow-thistle - apply when thistles have 10 - 15 cm of new growth. Do not cultivate for 2 weeks after application. Do not replant any crops in the treated areas except soybean, corn, white bean, wheat, barley, canola, and field peas.

Apple orchards: Annual weeds, Canada thistle, dandelions, field horsetail, hoary cress, poison ivy, poison oak, perennial sow-thistle, quackgrass (suppression).

Shelterbelts: Annual weeds, Canada thistle, dandelions, poison ivy, poison oak, perennial sow-thistle, quackgrass (suppression).

Pasture and non-cropland (roadsides, fencerows, ditch banks):

Weeds	Rate	Application directions
Canada thistle, perennial sow-thistle	5.0 - 11.3 L/acre	Apply when most thistles are in the early bud to bloom stage. Do not cultivate for 3 weeks. Do not till infested areas during the fall or spring before treatments
cattails	15 - 18.5 L/acre	Apply after catkins are fully formed and up to frost. Do not disturb sprayed plant. Do not apply where water will be used for irrigating, drinking or other domestic uses. Do not apply where water is not wholly confined to users property.
dandelions	1.7 - 5.0 L/acre	Treat when dandelions are young and actively growing. Tillage can occur 3 weeks after treatment but is not necessary.
field horsetail	5 - 6.6 L/acre	Spray when horsetail is growing vigorously. Usually when 10-15 cm in height.
hoary cress	7.5 - 11.0 L/acre	Spray during advanced rosette and bud stages. Treated area should not be mowed. If necessary re-treat with one half the original rate when re-sprouts are 10 to 15 cm tall.
leafy spurge	15 - 18.5 L/acre	Spray between the advanced flowering and early seed development stage. Treated areas should not be mowed but may be plowed after top growth is bleached. Spot treat regrowth the following year.
milkweed	7.5 - 11.0 L/acre	Treat in early summer when a majority of shoots have emerged. Spot treat any regrowth the following year.
poison ivy, poison oaks	3.7 L/acre	Apply in 200 to 400 litres of water per acre as an overall spray or as a spot treatment. Apply anytime after foliage is fully developed in spring until plant begins to turn colour in the fall. Spray thoroughly, wet leaves, stems and suckers to ground line.
quackgrass	5.0 - 11.3 L/acre	Apply when quackgrass is 10 - 15 cm tall. For best results, cultivate 3 weeks after treatment.
toadflax	7.5 - 11.0 L/acre	Treat during advanced rosette to prebud stage. Till 3 weeks after treatment, when top growth is bleached. Spot treat any regrowth the following year.

Application Information

How to Apply: Ground applications only. **Do not apply by air.**

Water Volume: Non-crop areas: 40 - 120 L/acre, Crop areas: 20 - 80 L/acre, Shelterbelts: 40 - 120 L/acre.

Application tips

Avoid using rates greater than 8 L/ac during preplant application on light soils with low organic matter. Spray to

Amitrol 240 (cont'd)

point of runoff, complete coverage of weeds essential. For good control, complete coverage of weeds is essential. Under or around desirable plants or trees, avoid contact with foliage, green stems or fruit as severe injury or destruction may result. Use a hooded sprayer if necessary. Do not disturb or mow treated plants for 3 weeks after treatment. If no tillage is possible, then spot treat weed regrowth or respray at 1/2 original rate. Do not contaminate any body of water. Do not apply where water will be used for irrigating, drinking or other domestic use. Do not spray near sparks or open flame. For best results, apply Amitrol 240 in the early morning or evening when the humidity is higher. Avoid application when daytime temperatures exceed 25°C or when air conditions are very dry.

How it Works

Systemic herbicide that inhibits chlorophyll production. Moves through foliar and root system.

Expected Results

Whitening begins in 7 - 14 days and plants die. Poor results may be expected if poor coverage, inadequate rate, plants over-mature or under drought stress or if tilled too soon after application.

Restrictions

Rainfall: Heavy rain within 6 - 8 hours reduces effectiveness.

Grazing Restrictions: Do not graze treated crops or weeds; sufficient data is not available to support such use.

Re-cropping Restrictions: Crops, other than those listed in a pre-seed application may be seeded 8 months after treatment with Amitrol 240.

Environmental Precautions

Do not contaminate any body of water. Use caution to prevent spray, spray mist, or vapours from drifting off target. Spray drift may cause damage to crops or vegetation.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical amitrole >4,000 mg/kg, technical ammonium thiocyanate - carrier 764 mg/kg. May be irritating to skin and eyes. Non-toxic to fish and birds.

Caution: Possible human goitrogen. Do not apply on foraging bees.

Storage

Do not store near food or feeds. Store away from area where temperature could reach greater than 50°C.

Do not store below 4°C. No shelf life limitation. Do not freeze, however; if frozen, contents will crystallize - to re-suspend, warm to 27°C and agitate as necessary.

Arsenal



Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres treated by 9.5 L jug
Arsenal (PCP# 23713)	BASF Canada	Imazapyr	Aqueous solution	9.5 L	7.9

Note: This product is to be applied by licensed applicators only.

Crops

Non-crop/non-graze areas such as industrial sites or rail road ballast. Spot treatments for hydro, pipeline and rail rights-of-way; pipeline stations including well sites; battery stations and compressor or valve stations. Site preparation prior to planting white spruce seedlings in the Boreal Forest Region.

Weeds Controlled and Staging

Apply post-emergence to actively growing weeds

Annual grasses			
annual bluegrass	foxtail spp.	old witchgrass	
Annual broadleaves			
annual sow-thistle	hemp-nettle	pigweed spp.	sow-thistle (annual)
black medic	kochia*	pineappleweed	stinkweed
common groundsel (common)	lamb's-quarters	rough cinquefoil	wild buckwheat
fleabane spp.	mustard spp.	Russian thistle	
Biennials			
bull thistle	burdock	goat's-beard	mullein spp.
Perennials			
bladder campion	dog-strangling vine	plantain spp.	tufted vetch
bromegrass	fescue spp.	poison ivy	wild grape
Canada bluegrass	field bindweed	quackgrass	wild strawberry
Canada thistle	milkweed	sheep sorrel	yellow nutsedge
clover spp.	mouse-ear chickweed	sulfur cinquefoil	
dandelion	ox-eye daisy	toadflax	
Woody species (seedlings)			
maple	poplar	raspberry	wild rose
Prior to planting spruce seedlings			
aspen	bluejoint reedgrass		

* **Note:** Prairie-wide surveys of kochia fields have found approximately 90% of kochia populations that are Group 2 herbicide resistant. Without testing to confirm, assume the kochia in your field is resistant and will not be controlled by this product alone.

Rate

1.21 L/ac. For small areas apply 30 mL per 100 m².

Tank Mixes

None.

Application Information

How to Apply: Ground applications only. **Do not apply by air.**

Water Volume: 40 - 223 L/acre.

Application Tips

Apply in sufficient water (40 - 223 L/ac) to wet all foliage during periods of active growth. Do not mix or store in unlined steel (except stainless steel) containers or spray tanks. Do not use where roots from desirable vegetation may extend into the treated area. Maintain a distance from desirable trees equal to at least twice the distance from the trunk to the drip-line. Do not apply where runoff water may flow onto agricultural land.

How it Works

Absorbed by both roots and foliage of sensitive vegetation. Translocated throughout the plant including the root system in both the xylem and the phloem. Non-selective. Plant stops growing shortly after application.

Expected Results

Plants stop growing within 24 - 48 hours. Yellow, purplish and/or red discolouration of the leaves may occur. The growing point of the plant and the youngest leaves begin to die first, with symptoms eventually progressing to older leaves. Chlorosis and tissue necrosis may not be apparent in some plant species until 2 weeks after application. Complete kill of plants may not occur for several weeks.

Restrictions

Rainfall: Rainfall within 2 hours may decrease foliar activity. Rainfall does not affect root activity or the control of non-emerged sensitive species.

Grazing restrictions: Do not graze the treated area or cut for hay.

Re-cropping Restrictions: Non-crop/non-graze applications only.

Environmental Precautions

Arsenal is toxic to non-target aquatic and terrestrial plants. Leave 20 metres from the downward edge of the spray

Arsenal (cont'd)

boom to sensitive terrestrial habitats. (Buffer zones for protection of terrestrial habitats are not required for use on rights-of-way, including railroad ballast, rail and hydro rights-of-way, utility easements and roads). Do not apply where runoff water may flow onto agricultural land as injury to crops may result.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) 5,000 mg/kg. Non-toxic to fish, birds and bees.

Storage

Store above -12°C. Arsenal should not be mixed or stored in unlined steel (except stainless steel) containers or spray tanks.



Caution Poison

Assert 300 SC/Avert

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Assert 300 (PCP# 21032)	Nufarm Agriculture Inc.	Imazamethabenz-methyl	SC	2 x 10.8 L jug
Acidulate (pH adjuster)	Nufarm Agriculture Inc.	Sodium bisulfate	WSG	2 x 2.5 kg bags
Avert (PCP# 29618)	Viterra	Imazamethabenz-methyl	SC	2 x 10.8 L jug
Acidulate (pH adjuster)	Viterra	Sodium bisulfate	WEG	2 x 2.5 kg bag

Crops and Staging

Crops	Recommended stage
Spring and durum wheat (8.3)	Up to and including 6 leaf stage before the flag leaf
Barley (8.5)	
Annual ryegrass (seed production only) (8.5)	4 - 6 leaf stage
Sunflower	2 - 8 leaf stage. Crop must be less than 38 cm tall for regular varieties and less than 30 cm high for semi-dwarf varieties and less than 10 cm tall for dwarf varieties.

Note: Sunflower rate: 0.34 L/acre.

Weeds, Rate and Staging

Weeds controlled	Staging	Rates	Acres to treat per 10.8 L jug
wild oats	1 - 3 leaf stage	0.54 L/acre	20 acres
wild oats	4 leaf stage	0.67 L/acre	16 acres
wild mustard stinkweed	Cotyledons - 6 leaf stage	0.34 L/acre Sunflower rate	32 acres
wild buckwheat* tartary buckwheat* volunteer canola, (except Clearfield canola)	Cotyledons - 4 leaf stage	0.54 L/acre	20 acres

* Suppression only

Tank Mixes

Tank-mix partners	Product rate	Remarks
In spring wheat (including durum) and barley		
2,4-D ester*	Up to 0.32 L/acre (700g/L formulation)	Black and Gray Wooded soil zones: tank-mix Assert @ 0.67 L/acre. Brown and Dark Brown soil zones: tank-mix Assert @ 0.54 L/acre, if the majority of wild oats are in the 1-3 leaf stage: 0.67 L/acre of Assert if wild oats are in the 4-leaf stage.
Attain**	Attain A: 0.24 L/acre + Attain B: 0.40L/acre	
Curtail M**	0.81 L/acre	
Dichlorprop ¹	0.71 L/acre	
Estaprop*	0.70 L/acre	
Nuance** + 2,4-D ester	Nuance (4 g/acre) + 2,4-D LV 700 (0.24 L/acre)	
Frontline**	Frontline A (0.04 L/acre) + Frontline B (0.34 L/acre + pH adjuster (0.25% V/V)	
Infinity**	0.336 L/acre	
MCPA ester*	Up to 0.38 L/acre (600g/L formulation)	Black and Gray Wooded soil zones: tank-mix Assert @ 0.67 L/acre. Brown and Dark Brown soil zones: tank-mix Assert @ 0.54 L/acre, if the majority of wild oats are in the 1-3 leaf stage: 0.67 L/acre of Assert if wild oats are in the 4-leaf stage.
Prestige**	Prestige A (0.32 L/acre) + Prestige B (0.81 L/acre)	
Cordon	0.12 L/acre	
Cordon + MCPA	0.12 L/acre + 0.28 L/acre	
Cordon + RefineSG/Deploy/Nimble	0.12 L/acre + 6 g/acre (9 gm Refine SG)	
Refine SG/Deploy/Nimble**	8 g/acre (12 gm Refine SG)	
Refine SG/Deploy/Nimble + MCPA**	8 g/acre (12 gm Refine SG) + 0.24 - 0.38 L/acre (600 g/L formulation)	
Spectrum**	Spectrum A (0.04 L/acre) + Spectrum B (0.51 L/acre) + pH adjuster (0.25% V/V)	
Trophy**	Trophy A (0.24 L/acre) + Trophy B (0.45 L/acre + pH adjuster ((0.25% V/V)	
In spring wheat (including durum) only		
Turboprop 600**	0.7 L/acre	All soil zones: Assert @ 0.54 L/acre

* Use a spray volume of 20 - 40 L/acre

** Use a spray volume of 40 L/acre

¹ Use Dichlorprop from the 4 leaf to 6 leaf stage to avoid crop injury.

Application Information

How to Apply: Ground applications only. Do not apply by air.

Water Volume: Cereals: 20 - 40 L/acre. Note: Use Assert with pH adjuster (one bag per 10.8 L jug) or poor weed control may occur. For ground-driven pump systems, ensure spray water pH adjuster is dissolved before engaging pump.

Application Tips

Do not apply Assert/Avert within 5 days of any herbicide that is not a registered tank mix. Do not make more than one application of Assert per growing season. Do not apply Assert/Avert to the same field in two successive years. Do not spray Assert when freezing temperatures are forecast. **Note:** the additive effect of soil residues from the use of Assert 300SC herbicide and Ally, Curtail M, Odyssey, Pursuit or Prestige herbicides on the same land has not been determined.

How it Works

Absorbed by foliage and roots and translocated to the growing points in the plant. Disrupts plant metabolism, causing growth to stop in susceptible plants. Works best at warm temperatures. Do not apply to drought-stressed sunflower.

Assert 300 SC/Avert (cont'd)**Expected Results**

Absorbed through the foliage and roots of wild oats, wild mustard and stinkweed, wild buckwheat, and tartary buckwheat plants. Susceptible plants stop growing soon after spray application. Obvious signs of plant death may not be seen in some plants until 2 weeks later but the competitive effect of these plants will have been removed. Death may not occur for several weeks.

Restrictions

Effect of Rainfall: Do not apply if rain is predicted within 6 hours.

Grazing: Do not graze treated fields or cut treated forage for silage or hay; sufficient data are not available to support such use. (Barley, wheat grain or straw from fields treated with Assert can be fed to livestock.)

Re-cropping: Rotation to the following crops can be made. **One-year after application:**

Black and Grey Wooded soil zones: spring wheat, durum wheat, barley, sunflower, canola, flax, peas.

Brown and Dark Brown soil zones: spring wheat, durum wheat, barley, sunflower, and CLEARFIELD canola.

Two years after the application: Following crops can be grown in all soil zones: spring wheat, durum wheat, barley, sunflower, peas, canola, flax, oats, canary grass. Conduct a field bioassay before planting lentils and sugar beets.

Note: The additive effect of soil residues from the use of Assert and Ally, Curtail M and Prestige on the same land has not been determined. Crop rotation guidelines and minimum rotation intervals are not known and injury to rotational crops other than wheat (excluding durum) may occur. Where these herbicides have been used, plant only wheat (excluding durum) until a bioassay demonstrates that other crops can be successfully grown.

Environmental Precautions

Avoid application of Assert within 15 metres of water bodies (lake, pond, slough, streams, rivers).

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 3,078 mg/kg. Non-toxic to fish, birds, and bees.

Storage

Store between 0° - 35° C. Do not freeze. Shake well before using.

Assert FL

Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Assert 300 (PCP# 21032)	Nufarm Agriculture Inc.	Imazamethabenz-methyl	SC	13.5 L
Frontline A (PCP# 27029)	Dow AgroSciences	Florasulam	EC	0.8 L
Frontline B (PCB # 27030)	Dow AgroSciences	MCPA	EC	5.61 L
PH adjuster	Nufarm Agriculture Inc.	Sodium bisulfate	WSG	3.12 kg

Crops and Staging

Crops	Staging	Rate and acres to treat per package
Barley	2 - 6 leaf stage	Assert: 0.67 L/acre; Frontline A: 40mL/acre; Frontline B: 0.28 L/acre. One case of Assert FL treats 20 acres.
Spring and durum wheat		

Weeds and Staging

Control		Suppression
annual sunflower	prickly lettuce	annual sow thistle
ball mustard	redroot pigweed	Canada thistle
burdock	Russian pigweed	dandelion (seedlings and overwinter rosettes, <15 cm)
cleavers	shepherd's-purse	perennial sow thistle
common chickweed	smartweed	plantain (top growth)
common ragweed	stinkweed	stork's-bill
flixweed	volunteer canola*	
hemp-nettle	wild buckwheat	
kochia	wild mustard	
lamb's-quarters	wild oats	

*Including all herbicide tolerant varieties

Note: broadleaf weeds controlled up to 4 leaf stage, wild oats controlled up to 6 leaf stage.

Tank Mixes

None.

Application Information

How to Apply: Ground only.

Water Volume: 20 - 40 L/acre. Note: Use Assert FL with pH adjuster (one bag per 10.8 L jug) or poor weed control may occur. For ground-driven pump systems, ensure spray water pH adjuster is dissolved before engaging pump.

Application Tips

Do not apply to crops underseeded to legumes. Apply Assert FL early post-emergence to the main flush of weeds. Warm, moist conditions that promote active weed growth, small weed size, competitive crop and good growing conditions after application will optimize the weed control. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed, and regrowth may occur. For best results, ensure adequate spray coverage of the target weeds. Only weeds that have emerged at time of application will be controlled. If the foliage of the weed is wet at the time of application, control may be reduced. **Note:** the additive effect of soil residues from the use of Assert 300SC herbicide and Ally, Curtail M, Odyssey, Pursuit or Prestige herbicides on the same land has not been determined.

How it Works

Assert is absorbed by foliage and roots and translocated to the growing points in the plants. Disrupts plant metabolism causing growth to stop in susceptible plants. Frontline tank mix is readily absorbed by the weed foliage. The florasulam inhibits the ALS enzyme in plants, resulting in a rapid halt in growth followed by yellowing and reddening of the foliage, followed by death of susceptible weeds. The MCPA portions of Frontline mimic the naturally occurring plant hormones and control the weeds by disrupting normal plant growth patterns.

Expected Results

Wild oats: Stop growing within 24 - 48 hours. Yellow striping and purplish discolouration of the leaf may occur. Leaves begin to die in 3 - 10 days, starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks. Symptoms may occur more slowly at lower temperatures and high rainfall.

Broadleaf weeds: Weeds susceptible to the Frontline tank mix will stop growing almost immediately. The weeds turn yellow or reddish. Symptoms such as yellowing and red colouration may not be noticeable for 1 - 2 weeks. Some twisting may also be observed on weeds. Warm, moist conditions, small weed size and competitive crop will optimize weed control provided.

Restrictions

Effect of Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage, and a repeat treatment may be required. Do not apply if rainfall is forecast for the time of application.

Grazing: Do not graze treated fields or cut treated forage for silage or hay; sufficient data are not available to support such use. (Barley, wheat grain or straw from fields treated with Assert FL can be fed to livestock.)

Re-cropping: Rotation to the following crops can be made. **One-year after application:**

Black and Grey Wooded soil zones: spring wheat, durum wheat, barley, sunflower, canola, flax, peas.

Assert FL (cont'd)

Brown and Dark Brown soil zones: spring wheat, durum wheat, barley, sunflower, and CLEARFIELD canola.

Two years after the application, following crops can be grown in all soil zones: spring wheat, durum wheat, barley, sunflower, peas, canola, flax, oats, canary grass. Conduct a field bioassay before planting lentils and sugar beets.

Environmental Precautions

Avoid application of Assert FL within 15 metres of water bodies (lake, pond, slough, streams, rivers).

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 3,078 mg/kg. Non-toxic to fish, birds, and bees.

Frontline A: has extremely low acute toxicity. Acute LD₅₀ = >6,000 mg/kg. Frontline B: has moderate acute toxicity.

Acute LD₅₀ of technical = 700 - 800 mg/kg.

Storage

Store between 0° - 35° C. Do not freeze. Shake well before using.

Assure II/Yuma

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Assure II (PCP# 25462)	E.I. duPont Canada	Quizalofop-p-ethyl: 96 g/L	EC	1 x 8 L
Sure-Mix (PCP# 25467)		Surfactant blend (30%) + Petroleum Oil (60%)		1 x 8 L
Yuma (PCP# 29134)*	Gowan Company	Quizalofop-p-Ethyl: 96 g/L		EC
XA Oil Concentrate (PCP# 11769)	United Agri Products	Surfactant blend (17%) + mineral oil (83%)		

* Herbicide package does not include surfactant but surfactant is required. XA Oil concentrate is recommended at 5 - 10 L/1,000L of spray solution but other surfactants can be used.

Crops and Staging

No stage restrictions.

canola	flax or solin (low linolenic varieties)	peas (field and processing)	snap beans
common dry beans	lentils	seed alfalfa	soybeans
creeping red fescue (seed production)	oriental mustard (condiment type)	seedling legumes (seed production)	sugar-beet
	camelina		

*Seedling legumes includes bird's-foot trefoil, alsike, red, white and sweet clover, and sainfoin.

Weeds, Staging and Rates

Weeds controlled	Weed leaf stage	Rate
green foxtail volunteer barley	2 leaf to early tillering	Assure: 0.15 L/acre + Sure-Mix@ 0.5 - 1% v/v
volunteer corn	2 - 6 leaf	
volunteer oats* volunteer wheat	2 leaf to early tillering	
wild oats*	1 - 5 leaf without tillers	

Weeds controlled	Weed leaf stage	Rate
barnyard grass	2 leaf to early tillering	Assure: 0.20 L/acre + Sure-Mix@ 0.5 - 1% v/v
wild oats	1 - 5 leaf to early tillering (up to two tillers)	
fall panicum old witchgrass proso millet yellow foxtail	2 leaf to early tillering	
quackgrass (suppression) foxtail barley (suppression)	2 - 6 leaf 3 - 4 leaf (plus 3 tillers)	Assure: 0.20 L/acre + Sure-Mix@ 0.5 - 1% v/v
quackgrass (season-long control)	2 - 6 leaf	Assure: 0.30 L/acre + Sure-Mix@ 0.5 - 1% v/v

* Best results on volunteer/wild oats if application is made before tillering begins.

Tank Mixes

In canola:

Assure (0.15 - 0.20 L/acre) + Muster (8 - 12 g/L) + Sure Mix or Merge (0.5% v/v)

In creeping red fescue:

Assure (0.20 - 0.30 L/acre) + Ally Toss-N-Go (3 g/L) + Sure Mix or Merge (0.5% v/v)

Assure (0.20 - 0.30 L/acre) + Refine SG (12 g/ac) + Sure Mix or Merge (0.5% v/v)

In pinto, pink, great northern and small red beans:

Assure II (0.20 - 0.30 L/acre) + Basagran (0.70 - 0.91 L/acre) + Sure Mix or Merge (0.5% v/v)

Application Information

Water Volume: Ground: Minimum of 40 L/acre. Up to 162 L/acre of water may be used under heavy populations to improve coverage. Air: 10-20 L/acre.

Application Tips

How it Works: Assure II is a systemic herbicide that is rapidly absorbed and readily translocated from the treated foliage to the root systems and growing points of treated plants.

Expected Results

Grassy weeds show a reduction in growth and a loss of competitiveness. An early yellowing or browning of the younger plant tissues is followed by a progressive collapse of the remaining foliage. These results will generally be observed in 1 - 3 weeks, depending on the grass species treated and the environmental conditions. Poor results may be expected if there is improper mixing, timing or coverage, or when weeds are under stress.

Rainfall: Rainfall within 1 hour of application may reduce control.

Restrictions

Re-cropping: No restrictions the year after application.

Grazing restrictions: Do not graze treated fields or harvest for forage or hay.

Pre-harvest Intervals: Do not apply to canola within 64 days of harvest. Do not apply to chickpeas within 85 days of harvest. Do not apply to flax within 82 days of harvest. Do not apply to lentils or peas (field and processing) within 65 days of harvest. Do not apply to beans within 30 days of harvest if used alone, 65 days if used in a tank mix with Basagran.

Environmental Precautions

Assure II is toxic to fish. Overspray or drift to fish-bearing water must be avoided. Overspray or drift to important wildlife habitats such as shelterbelts, wetlands, sloughs or dry slough borders and woodlots should be avoided. Leave a 15-metre buffer zone between the last spray swath and the edge of any of these habitats.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) >5,000 mg/kg. May irritate eyes, nose, throat and skin.

Storage

Store in a cool, dry place not below 5°C.

Atrazine



Caution Irritant

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Aatrex Liquid 480 (PCP# 18450)	Syngenta	Atrazine 480 g/L	Liquid suspension	1 x 14 L, bulk
Atrazine 480 (PCP# 20997)	United Agri Products	Atrazine 480 g/L		2 x 10 L pack

Crops and Staging

Timing	Rate	Crop		
Pre-plant incorporated	Light and sand: 0.85 - 1.25 L/acre Loam and clay: 1.25 L/acre	Silage corn (9.0)	Field corn	Sweet corn (8.6)
Pre-emergence*	0.85 - 1.25 L/acre plus 6.88 L/acre corn oil or 1.11 - 2.23 XA Oil concentrate			
Post-emergence (1 - 6 leaf stage)				

*Rainfall is required within 10 days or a shallow cultivation will be necessary.

Note: For pre-plant incorporated and pre-emergence application, nitrogen solutions or complete liquid fertilizers may replace the water as a carrier. Do not apply after the corn has emerged, as there is danger of liquid fertilizer causing crop injury.

Weeds Controlled

annual smartweed
common purslane
lady's-thumb

lamb's-quarters
ragweed
redroot pigweed

volunteer clover
wild oats
wild buckwheat

wormseed mustard
wild mustard

Tank Mixes

Fertilizers: For pre-plant incorporated and pre-emergence application, nitrogen solutions or complete liquid fertilizers may replace the water as a carrier. Do not apply after the corn has emerged as there is danger of liquid fertilizer causing crop injury.

Many dry bulk granular fertilizers may be impregnated with Aatrex or Aatrex plus Dual II Magnum or Eradicane 8E as a preplant incorporated application to control weeds in corn.

Oil-water emulsions (post-emergent treatment): Atrazine 480.

Preplant-incorporated: Aatrex Liquid 480 (0.85 - 1.25 L/acre + DUAL II Magnum (0.5 - 0.7 L/acre).

Application Tips

Continuous gentle agitation is needed. Avoid excessive agitation, especially with oil mixtures, as a grease-like mass may form. Use oil mixes at once and clean tank and system with a strong detergent solution. Use 50 mesh or larger strainers and use only metal filters. Bypass line should discharge to bottom of tank. Band treatments are desirable when cultivation is to alleviate hard soil conditions or to control annual weeds.

How it Works

A systemic herbicide absorbed through both roots and foliage and it is translocated to the leaves where it inhibits photosynthesis.

Expected Results

Affected plants are slow to emerge and are wilted, yellowish and eventually turn brown and die. Poor weed control may be expected if improper incorporation is done, or when post-emergent application is made with oil concentrate or sprayed too late. Heavy rainfall on sandy soils may cause leaching and a decrease in weed control and/or crop injury.

Rainfall: Rainfall will activate the chemical, carrying it into the root zone where kill will begin.

Grazing: Do not graze treated immature crops or cut for fodder.

Restrictions

Recropping: Plant only to corn in year of treatment. The use of atrazine on the prairies is not recommended when corn is grown in rotation with other crops except triazine-tolerant canola. Breakdown of atrazine in the soil is slow and may cause injury to sensitive crops (e.g. cereals, canola, sugar beets) one or more years after application. Crops most tolerant after corn and triazine tolerant canola are sorghum, then flax, faba beans and peas. The risk of damage to succeeding crops from atrazine residues may be reduced by ploughing or deep tilling treated fields in the fall prior to seeding the next crop in the rotation. Spreading and incorporating manure may also help to reduce the atrazine levels. Uneven application, excessive sprayer overlap or applications in excess of recommended rates will not injure corn but may result in a longer carryover of atrazine residues. A prolonged period of dry weather will also lengthen the time that atrazine residues remain in the soil.

Environmental Precautions

Toxic to non-target terrestrial plants and aquatic organisms. Do not over-spray or drift to non-target aquatic habitats. Leave at least 10 m from the downwind edge of the spray swath to the sensitive terrestrial and aquatic habitats. Do not mix or load within 30 m of any wells, lake, streams, ponds, dugouts or sinkholes. Heavy rainfall on sandy soils may cause runoff and leaching. To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip (buffer zone) between the treated area and the edge of the water body. The use of Atrazine may result in contamination of groundwater, particularly on areas where soils are permeable (e.g., sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) Aatrex = 1,075 mg/kg. May cause eye irritation. Very low toxicity to fish and birds.

Storage

The flowable formulations should be kept from freezing. If stored in unheated areas, the product should be warmed and agitated thoroughly prior to using.

Attain XC



Caution Irritant



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres to treat per package
Attain XC A(PCP# 29643)	Dow AgroScience Canada Inc	Fluroxypyr: 333 g/L	EC	5 L, 8 x 2 x 7.5 L bulk	40 or 53 acres (case), 240 - 320 acres for bulk package
Attain XC B(PCP# 29264)	Dow AgroScience Canada Inc	2,4-D LV ester: 660 g/L	EC	2 x 6.8 L, 4 x 81.6 L bulk	

Crops and Staging

Cereals: 4 - flag leaf stage

Seedling and established grasses (seed production only): 2 - 4 leaf stage

barley	crested wheatgrass*	intermediate wheatgrass*	smooth brome grass*	tall fescue*
creeping red fescue*	durum wheat	meadow brome grass*	spring wheat	timothy*

* Registered under the User Requested Minor Use Registration. Dow Agro Science assumes no responsibility with respect to performance and/or crop tolerance.

Attain XC (cont'd)**Weeds Controlled**

Weed stage: 2 - 4 leaf stage, unless otherwise noted

Low rate: Attain XC A: 0.096 L/acre, Attain XC B: 0.26 L/acre (at low rate, one case will treat 53 acres, bulk package will treat 320 acres)

annual sunflower	field horsetail (top growth)	mustards (except green, dog & tansy)	shepherd's-purse
bluebur	flixweed	plantain	vetch
burdock	goat's-beard	prickly lettuce	volunteer canola
cleavers (1-4 whorls) (8.8)	hoary cress (top growth)	ragweed	wild mustard
clovers (sweet)	kochia*		wild radish

High rate: Attain XC A: 0.13 L/acre, Attain XC B: 0.34 L/acre, above weeds plus following (at low rate, one case will treat 40 acres, bulk package will treat 240 acres)

annual sow-thistle (suppression)	dog mustard	leafy spurge (top growth)	smartweed
blue lettuce (top growth)	field bindweed (top growth)	oak-leaved goosefoot	stork's-bill (1-8 leaf)
Canada thistle (top growth)	field peppergrass	perennial sow-thistle (top growth) (suppression)	tansy
common chickweed* (up to 8 cm)	gumweed	redroot pigweed	tartary buckwheat
dandelion (spring rosettes)	hairy galinsoga	round-leaved mallow (1-6 Leaf)	volunteer flax (1-12 cm)
docks	hedge bindweed	Russian thistle	wild buckwheat
	hemp-nettle (2-6 leaf stage)		
	lady's-thumb		

* Including biotypes resistant to Group 2 herbicides that inhibit ALS/AHAS enzymes

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate of herbicide tank mix partner	Adjuvant rate
Achieve Liquid*	Barley, spring wheat, durum wheat	0.2 L/acre	Turbocharge @ 0.5% v/v
Everest	Spring wheat, durum wheat	17.4 g/acre	Agral 90 or Ag Surf @ 0.25% v/v
Horizon**	Spring wheat, durum wheat	93 mL/acre	Score @ 0.8% v/v
Assort SC	Barley, spring wheat, durum wheat	0.53 - 0.65 L/acre	Acidulate
Puma 120 Super	Spring and durum wheat	0.16 - 0.31 L/acre	None required
Simplicity***	Spring and durum wheat	0.2 L/acre	None required
Simplicity****	Spring and durum wheat	0.15 L/acre	None required

* Do not apply this tank mix prior to the 4-leaf stage of the cereal crop as temporary crop injury could occur, particularly in spray overlaps.

** Wild oat control may be reduced when tank mixed with Attain.

*** The low rate of Attain is registered for use as a tank mix with Simplicity.

**** The low rate of Attain XC and Simplicity is a registered use when wild oat populations are less than 75 wild oats/square metre.

Application Information

How to Apply: Ground applications. **Do not apply by air.**

Water Volume: 45 L/acre.

Application Tips

Attain/Attain XC activity is influenced by weather conditions. Optimum activity requires active crop and weed growth. The temperature range for optimum activity is 8°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost before application (3 days) or shortly after (3 days) may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions, e.g. drought, heat or cold stress, or if weeds have initiated flowering, or if heavy infestations exist. Application before the 4-leaf stage of wheat and barley may cause severe twisting of leaves and leaf, stem and head deformities, which may reduce, yield up to 10%. Do not apply later than the flag-leaf stage. Some twisting may be evident on barley. This twisting is transitory and may disappear within 3 weeks.

How it Works

Attain herbicide tank mix is non residual. The components of Attain tank mix move within the plant to control exposed and underground plant tissue. It mimics naturally occurring plant hormones and controls weeds by disrupting normal plant growth patterns. Symptoms include twisting of stems and swollen nodes.

Expected Results

Broadleaf weeds: Weeds start to twist shortly after spraying. After twisting and bending, plants stop growing, turn brown and die.

Restrictions

Rainfall: Do not apply if rain is expected in 1 hour.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Do not harvest forage or cut for hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days prior to slaughter.

Pre-harvest Intervals: Do not harvest the treated mature crop within 60 days after application.

Recropping: Fields treated with Attain/Attain XC herbicides tank mix can be seeded the following year to barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye, wheat or summerfallowed. Do not seed crops other than those listed above for at least one year following treatment.

Environmental Precautions

Overspray or drift to important wildlife habitats, such as ponds, wetlands, streams, woodlots and shelterbelts, should be avoided. A 15-metre buffer zone should be established between areas to be sprayed and aquatic environments or terrestrial habitats listed above.

Runoff: Under certain conditions, Attain/Attain XC have the potential to runoff from treated areas. To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Site characteristics and conditions that may lead to runoff include, but are not limited to heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g. soils that are compacted, fine textured, or low in organic matter such as clay). Avoid application of this product when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip (buffer zone) between the treated area and the edge of the water body.

Toxicity

2,4-D has moderate acute mammalian toxicity. Acute oral LD_{50} = technical 639 - 764 mg/kg. Fluroxypyr has very low mammalian toxicology. Acute oral LD_{50} >2,000 mg/kg.

Storage

Store in a dry, heated area. If product is frozen, bring to room temperature and agitate before use.

Authority

Group 14

Formulations

Product	Company	Active ingredient	Formulation	Package size
Authority (PCP# 29012)	Nufarm Agriculture Inc.	Sulfentrazone	Solution: 480 g/L	4 x 3.8 L jug

89 mL/ac = 40 ac/jug, 118 mL/ac = 32 ac/jug.

Crops and Staging

Crop	Stage	Rate*
Chickpea	Prior to seeding or up to 3 days post seeding	89 - 118 mL per acre
Field peas		
Flax		
Sunflowers		

Note: *Rate is dependent on soil type, pH and organic matter; please refer to the label.

Authority (cont'd)**Weeds Controlled and Staging****Broadleaf weeds controlled**

kochia

lamb's quarters

red root pigweed

wild buckwheat

Application Information

Authority herbicide may be applied to the soil as a pre-plant incorporated treatment or as a pre-emergence (to weed and crop) surface application. Do not make fall applications to any crops.

How to Apply: Ground only.

Water Volume: Minimum 40 L/ac.

Application Tips

Pre-plant incorporated treatments require a uniform surface application followed by thorough incorporation to a depth no greater than 5 centimetres. Care must be taken not to create overlaps in treated zones due to soil movement, which will result in excessive Authority herbicide rates that could result in adverse crop response. Additional care must be exercised to prevent deep incorporation of Authority herbicide, which may result in poor weed control performance on shallow germinating weeds. All soil applications of Authority herbicide require adequate rainfall for herbicidal activation.

Do not apply Authority (or any sulfentrazone products) in consecutive years. In case of drought in any of those years, a subsequent application of Authority should be further delayed. **Do not** apply to soils classified as coarse-textured soils. **Do not** apply in fine texture soils with less than 1.5% organic matter. **Do not** apply in any type of soils with an organic matter content greater than 6%. **Do not** use on soils with a pH of 7.8 or greater. If using irrigation with water that has a pH greater than 7.5, please review the label for adverse crop response. If adequate moisture from rainfall or irrigation is not received within 7 to 10 days of application, a shallow incorporation no deeper than 5 cm may be needed to obtain adequate weed control. **Do not** store the sprayer overnight or for an extended period of time with the sulfentrazone spray mixture in the tank.

How it Works

Sulfentrazone controls weeds by the process of protoporphyrinogen oxidase inhibition (membrane disruption), a mode-of-action commonly referred to as PPO inhibition. Sulfentrazone is primarily taken up by the roots of treated plants.

Expected Results

Plants emerging from treated soil turn necrotic and die after exposure to light. Foliar contact causes rapid desiccation and necrosis of exposed plant tissue. Shoot-root soil placement studies indicate that sulfentrazone is primarily absorbed by the roots of the plant following soil applications.

Restrictions

Recropping restrictions: Alfalfa, barley, corn (field corn), wheat (spring and durum): 12 months after application, winter wheat: 16 months, canola, corn (sweet and pop), sorghum: 24 months, lentils: 36 months.

For crops not listed above, a minimum rotational crop interval of 36 months must be observed and a representative bioassay of the field must be conducted with the rotational crop and adequate soil moisture to evaluate potential crop sensitivity.

Rainfall: Rainfall is required following application to activate the herbicide and for adequate weed control.

Grazing: Do not graze treated crops or cut for hay.

Pre-harvest Interval: Leave 60 days between application and harvest.

Environmental Precautions

Do not fill mix or clean sprayer within 15 m of any water source, unless the well is properly capped or activities take place on impervious pads or properly diked mixing/loading areas. Leave a 1 m buffer between the last spray path and water or wetland habitats and 10 metres to sensitive plants and upland habitats when applying by ground. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Toxicity

Oral (rats) LD₅₀ = 2,084 mg/kg.

Storage

Do not freeze.

Avadex MicroActive/ Extra Strength Avadex BW



Warning Poison

Group 8

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Avadex MicroActive (PCP# 16759)	Gowan Canada	Triallate: 10%	Granular	22.7 kg, 451.3 kg
Extra Strength Avadex BW (PCP# 25112)	Gowan Canada	Triallate: 480 g/L	EC	2 x 10 L, 100 L drum

Crops and Staging

Wheat (including durum) and barley: 2 - leaf to early flag leaf; winter wheat, fall rye: from the time growth commences to early flag leaf

barley	field peas	mustard	spring wheat
canarygrass	flax	rapeseed	sugar-beet
durum wheat			

Note: Alfalfa, bird's-foot trefoil and clover may be underseeded (provided they are not harvested for green feed, hay or silage in the year of treatment). Do not underseed with grasses or legume grass mixture.

Weeds Controlled and Staging

wild oats

Extra Strength Avadex Liquid Rates:

Fall treatment – after October 1 and until soil freeze-up.

Crop	Rate (L/acre)			Acres treated per 100 L drum		
	Organic matter			Organic matter		
	< 2%	2 - 4 %	> 4%	< 2%	2 - 4%	> 4%
Spring and durum wheat	1.01	1.17	1.41	99	85.4	70.9
Barley	1.01	1.17	1.41	99	85.4	70.9
Canola, flax*, mustard, sugar-beets	1.41	1.41	1.86	70.9	70.9	53.8

Spring treatment – before or after seeding

Crop		Rate (L/acre)		Acres treated per 100 L drum	
		Organic matter		Organic matter	
		4% or less	Greater than 4%	4% or less	Greater than 4%
Spring and durum wheat	Before seeding	1.01	1.17	99	85.4
	After seeding	1.17	1.41	85.4	70.9
Barley	Before seeding	1.01	1.17	99	85.4
	After seeding	1.17	1.41	85.4	70.9
Canola, flax*, mustard, sugar-beets	Before seeding	1.41	1.86	70.9	53.7

Avadex MicroActive/Extra Strength Avadex BW (cont'd)

Crop		Rate (L/acre)		Acres treated per 100 L drum	
		Organic matter		Organic matter	
		4% or less	Greater than 4%	4% or less	Greater than 4%
Peas	Before seeding	1.41	1.41	70.9	70.9

* Do not use on low linolenic acid varieties of flax.

Avadex Microactiv Granular Rates (kg/acre) – Minimum Tillage/Direct Seed Systems

Crop	Rate (kg/acre)		Acres treated per 22.7 kg bag	
	Organic matter		Organic matter	
	2 - 4 %	Greater than 4 %	2 - 4 %	Greater than 4 %
Fall application				
Spring and durum wheat	5.6	6.9	4.0	3.3
Barley and canarygrass	5.6	6.9	4.0	3.3
Canola, flax*, mustard, sugar-beets	6.9	8.9	3.3	2.6
Spring application				
Spring and durum wheat	5.6	6.9	4.0	3.3
Barley and canarygrass	5.6	6.9	4.0	3.3
Canola, flax*, mustard, sugar-beets	6.9	8.9	3.3	2.6

* Do not use on low linolenic acid varieties of flax.

Avadex MicroActiv Rates – Conventional Tillage Systems

Crop	Rate (kg/acre)			Acres treated per 22.7 kg bag		
	Organic matter			Organic matter		
	Less than 2%	2 - 4 %	Greater than 4 %	Less than 2%	2 - 4 %	Greater than 4 %
Fall applications (incorporated)						
Spring and durum wheat	4.45	5.67	6.9	5.1	4.0	3.3
Barley and canarygrass	4.45		6.9	5.1	4.0	3.3
Canola, flax*, mustard, sugar-beets	5.67	6.9	8.9	4.0	3.3	2.6

* Do not use on low linolenic acid varieties of flax.

Tank Mixes

Fertilizers: Extra Strength Avadex BW alone or tank-mixed with liquid formulations of Treflan or Rival may be tank-mixed in a minimum of 36 litres of sprayable fluid fertilizer carrier (such as 28-0-0) per acre as a broadcast treatment.

Herbicides: Extra Strength Avadex BW can be tank mixed with Treflan or Rival herbicide for the control of both wild oats and wild millet (green and yellow foxtail). This tank mixture can be applied after seeding wheat and barley only.

How to Apply

Extra Strength Avadex BW can only be applied by ground application. Granular formulations may be applied by air with attachments designed for applying low volumes of granules (Avadex MicroActiv).

Application Information

Liquid formulations:

Water volume: Minimum of 36 L/ac. Pressure: 200 kPa.

Incorporation:

Extra Strength Avadex BW/MicroActiv in conventional tillage systems: Two incorporation operations are

necessary for thorough mixing. For application made prior to seeding, incorporation with disc plus harrows or field cultivator plus harrows is recommended. The second incorporation should be at a right angle to first, with suitable disc or cultivator type implement. For application made after seeding, shallowly incorporate to a depth of 4 - 5 cm using suitable equipment such as harrow. The second incorporation can be conducted any time prior to crop emergence. Adjust incorporation equipment to a depth that will not disturb the seed. Do not incorporate more than 5 cm. This can be accomplished by setting the tillage equipment to work the soil no deeper than 7.5 cm - 10 cm. Shallow incorporation is necessary to prevent dilution of the product, thus decreasing wild oat control and increasing the risk of crop injury.

Liquid: The first incorporation should be completed as soon as possible on the day of spraying.

Granules: The first incorporation should be completed within 48 hours of application. The second incorporation for both liquid and granules may or may not be done immediately after the first. For maximum results from spring application of granules, delay second incorporation for at least 3 - 5 days.

Extra Strength Avadex BW/MicroActiv + fertilizer banding: Avadex BW/MicroActiv may be broadcast prior to or in conjunction with fall fertilizer banding. Banding unit should be operated at no less than 8 km/h to provide adequate soil mixing. Depth of operation of banding unit should be as recommended for proper fertilizer placement. Effective shank spacing of 30 cm or less will provide optimum results.

Spring application: If Extra Strength Avadex BW/MicroActiv is applied in the spring prior to banding unit operated using knife-type openers, two additional incorporations are required at right angles.

Fall application: The use of tine harrow on banding unit is not required but may provide superior incorporation where excessive trash is not a factor. The second incorporation should be at a right angle to the banding operation with suitable disc or cultivator type implement.

Extra Strength Avadex BW/MicroActiv in high disturbance systems (minimum tillage): A high disturbance incorporation can be conducted prior to seeding or as part of the seeding operation. A high disturbance system is one that disturbs the soil enough so that emerged weeds are controlled by the tillage. (High disturbance may be caused by the seed drill - cultivator or disc type, or with harrows following the seed drill or both.) Levelling the soil at or after seeding with harrows will ensure uniform product coverage and best performance. Application of granules 10 - 14 days prior to incorporation is required for best results.

Application Tips

Choice of formulation: Use liquid formulation on soil free of trash. Use granules on all soils including those with heavy trash cover. Granules may be applied in the fall prior to or in conjunction with fertilizer banding.

Fall minimum tillage application: Fall minimum tillage applications should be made when the average soil temperature at the 5 cm depth is 4°C or less and within 3 weeks of soil freeze-up. This situation generally occurs by October 1. No fall incorporation is required. Incorporation may be conducted in the spring prior to seeding or at seeding. Do not use this treatment on soil with less than 2% organic matter. Under excessively warm or wet conditions between application and crop emergence, control may be reduced. For best results on heavy wild oat infestations, use the incorporated treatments only.

Spring minimum tillage application: Apply Extra Strength Avadex BW/MicroActiv granules in the spring when average soil temperature at the 5 cm depth is 4°C or less. Applications should be made to soil which has adequate trash cover to prevent soil erosion between application and seeding. Ensure that the time between application and incorporation is a minimum of 10 - 14 days. Do not apply more than 4 weeks before intended seeding.

For optimum results with Extra Strength Avadex BW minimum tillage treatments, seed when wild oat growth is noticeable in the field. This will ensure that the soil is warm enough for activation of Avadex BW. Minimum tillage applications should not be made to fields covered with snow or excessive crop residue that will not allow granule contact with soil. If excessive crop residue exists at the time of application, a vigorous harrowing can be used to ensure that the herbicide granules make adequate contact with the soil. Under excessively warm or wet conditions between application and crop emergence, control may be reduced. For best results on heavy wild oat infestations, use the incorporated treatment only. Soil colour may not be a precise indicator of organic matter content. Ensure that the application rate chosen from the table is appropriate for your soil type.

Field preparation: Make sure the soil is in good working condition. Reduce trash to an acceptable level before application. If soil is excessively wet or lumpy, cultivate with suitable equipment to improve soil condition.

Seeding: Flax, mustard and rapeseed can be seeded in treated layers. Barley and wheat are more sensitive and should be planted 6.0 - 7.5 cm. Wheat must be seeded below the treated layer. After seeding, any deep ridges left by drills must be levelled by harrowing. Treflan/Rival Mixes: Drought conditions in the year of treatment may result in higher levels of Treflan/Rival carryover. To avoid wheat injury, seed 6.0 - 7.5 cm into warm, moist seedbed.

Avadex MicroActive/Extra Strength Avadex BW (cont'd)**How it Works**

Absorbed by germinating wild oat shoots, usually resulting in death before emergence. Under dry conditions, wild oats may emerge before being killed.

Expected Results

Wild oats: Usually kills wild oats before they emerge. Scraping away the soil 1 - 2 weeks following treatment will expose white to yellow wild oats shoots 2.0 - 2.5 cm in length with pinched tips. Plants which have emerged and absorbed a lethal dose will cease growth, leaves become brittle and bluish-green in colour. Under dry conditions, a rainfall of 1.5 cm or more when wild oats are emerging can cause post-emergent die-back of a high percentage of wild oat plants.

Crop: Wheat seeded into the treatment zone under very dry soil conditions may be thinned and delayed when germinating and emerging just prior to a heavy rainfall. Wheat must be seeded at least 1.5 cm below the treated layer of soil (e.g. 5 - 7.5 cm). Some wheat thinning may be noted on eroded knolls. Poor results may be expected if incomplete incorporation due to wet, cloddy soil or heavy trash, incorporation delayed, very dry soil conditions in spring or prolonged cool soil temperatures at time of germination. Ridges left by seeding may disrupt the treated layer and allow escapes.

Restrictions

Rainfall: Moisture is required for activation. Rainfall of at least 1.5 cm within 2 weeks of application in the spring is required to ensure maximum performance.

Grazing restrictions: Treated underseeded legumes cannot be harvested for green feed, silage or hay in year of seeding. Do not graze the treated crop or cut for hay; there are not sufficient data to support such use.

Re-cropping: Oats should not be seeded into soil treated with Extra Strength Avadex BW/MicroActiv in the previous year.

Environmental Precautions

Do not apply directly to water or to areas where surface water is present.

Runoff - to reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Site characteristics and conditions that may lead to runoff include, but are not limited to, heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g. soils that are compacted or fine textured such as clay). Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Leaching - the use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Volatilization - the active ingredient contained in this product is known to volatilize. Effort should be made to reduce the volatilization such as the following: (1) incorporation into the soil concurrently with application, (2) application should occur when soil temperatures are less than 4°C or less.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 1,675 - 2,165 mg/kg. May cause slight eye irritation. Slightly toxic to fish. Non-toxic to birds.

Storage

Store above 0°C. If frozen, warm to 22°C and agitate to redissolve crystals.

Avenge 200-C

Warning Poison

Group 8

Formulations

Product	Company	Active ingredient	Formulation	Container size	Acres per case
Avenge 200-C	Syngent Crop Protection	Difenzoquat: 200g/L	Liquid	2 x 10L jugs	11.6 - 14.0 acres

Crops and Staging

Apply up to 6-leaf stage of cereals and grasses

Cereals

barley (all varieties)	fall rye	triticale*
canaryseed*	spring wheat*	winter wheat*

*Syngenta will support the use of Avenge on a number of cereal varieties as listed on their website.

Seeding grasses for forages

meadow bromegrass	pubescent wheatgrass	tall fescue
meadow foxtail	streambank wheatgrass	tall wheatgrass

Forages underseeded to wheat or barley

alfalfa	crested wheatgrass	red clover	sweet clover
bird's-foot trefoil	kentucky bluegrass	red fescue	timothy
bromegrass	meadow fescue	reed canary grass	
creeping red fescue	orchard grass	Russian wild rye	

Weeds, Staging and Rates

Weeds controlled	Rates	Staging
Wild oats (1 - 200 plants/m ²)	1.42 L/acre	3 - 5 leaf (optimum: 3 - 4 leaf)
Wild oats (over 200 plants/m ²)	1.72 L/acre	

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate of herbicide tank mix partner	Remarks
2,4-D ester 500	Wheat and barley	Up to 0.45 L/acre	Do not apply by air
2,4-DB: Cobutox 625, Embutox 625, Caliber 625	Wheat, barley underseeded to forage grasses	0.71 - 0.91 L/acre	Do not apply to canarygrass
2,4-D Ester plus Dichlorprop: Estaprop Plus, Turboprop 600, Dichlorprop-D	Wheat and barley only	0.71 L/acre	Do not apply when underseeded to legumes
Ally Toss-N-Go	Wheat and barley	2 - 3 grams /acre	Do not add surfactant
Buctril M	Wheat and barley	0.4 L/acre	Use only on spring wheat varieties listed on the label
Curtail M	Wheat and barley	0.8 L/acre	Do not apply when underseeded to forages
MCPA ester 600 formulation	Wheat and barley	0.36 L/acre	
Pardner	Wheat and barley	0.4 - 0.48 L/acre	Do not apply by air
Refine Extra	Wheat and barley	8 grams/acre	Do not add surfactant

* Note: Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions

Application information

How to Apply: Ground and by air.

Water volume: Ground Applications: 40 L/acre. Air: 8 - 20 L/acre.

Application Tips

Do not apply if the crop is stressed from extreme drought or excessive moisture. Do not spray if freezing temperatures are forecast. Avenge can be sprayed if leaf surface is wet, as long as the spray solution will not drip off the leaf surface after application. Apply a minimum of 30 days after seeding for best results.

How it Works

Acts on the growing point located at or just above the soil surface; placing herbicide at or below this point is most efficient. Disrupts cell division and elongation causing growth to stop. Best at high temperature and humidity

Avenge 200-C (cont'd)**Expected Results**

Wild oats: Start to yellow within 3 - 5 days. Effect is faster when temperature and humidity are high. Affected plants will turn brown or remain stunted and partially green throughout the season but competitive effect will be removed. Wild oats in the 1 - 2 leaf stage at spraying or those that emerge after spraying will be unaffected.

Crop: Slight yellowing may be visible 5 - 7 days after application and will remain visible for 2 weeks. Poor results may be expected if spraying before 3 leaf stage; too low a rate for wild oat population; inadequate coverage due to dense broadleaf weeds; drought or temperature stress.

Restrictions

Rainfall: Do not spray if rainfall is forecast within 6 hours of application.

Grazing: Do not graze or feed crop for 8 weeks after treatment. Treated underseeded forages or seedling grasses for forage should not be grazed or harvested for feed during the year of treatment. Crop use after hail: Do not process for 8 weeks after treatment.

Re-cropping: No restrictions the year after treatment.

Environmental Precautions

Do not apply to any body of water. Avoid drifting of spray onto any body of water or other non-target areas.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD50 (rats) = 863 - 912 mg/kg. Non-toxic to fish, birds or bees.

Storage

Will withstand freezing temperatures, returning to full solution as temperature increases.



Caution Poison



Caution Irritant

Axial 100 EC

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Axial (PCP# 28642)	Syngenta Crop Protection Canada	Pinoxaden: 100 g/L	Emulsifiable concentrate	1 X 9.7 L, 77.6L
Adigor (adjuvant) (PCP# 28151)	Syngenta Crop Protection Canada	48.8% Rapeseed oil + 28.2% alcohol	Liquid	1 X 11.3 L, 90.4 L

Acres to treat per package: One 9.7 L container will treat 40 acres.

Crops and Staging

Crop	Staging (Zadoks Growth Stage)
Spring wheat (excluding durum) and barley	1 - leaf to flag leaf stage (11, 20 to 37) Caution: Do not apply past flag leaf stage

Weeds, Rate and Staging

Weeds	Rate	Staging
barnyard grass green foxtail Proso millet volunteer canaryseed volunteer oats wild oats yellow foxtail (wild millet)	Axial 100 EC @ 0.24L/acre plus Adigor: @ 0.283 L/acre	1 - 6 leaf, prior to 4th tiller Zadoks Growth Stage: (11, 20 to 16 and 23)

Tank Mixes

Tank mix partner ¹	Product rate	Remarks
Buctril M ⁴	0.4 L/acre	Temporary crop injury may occur with tank-mixes under extreme weather conditions or when the crop is suffering from stress due to inadequate or abnormally high moisture levels or extreme temperatures
Curtail M ⁴	0.6 - 0.81 L/acre	
MCPA ester 500 ⁴	0.34 - 0.44 L/acre	
Mextrol 450 M ⁴	0.50 L/acre	
Prestige ⁴	Prestige A: 0.24 - 0.33 L/acre + Prestige B: 0.6 - 0.8 L/acre	
Trophy ⁴	Trophy A: 0.24 L/acre + Trophy B: 0.45 L/acre	
Frontline/Frontline XL ^{2,4}	Frontline A: 40 mL/acre + Frontline B: 0.34 L/acre, XL 0.51 L/acre	
Spectrum ^{2,4}	Spectrum A: 40 mL/acre + Spectrum B: 0.60 L/acre	
Infinity	0.335 L/acre	
Refine SG ²	12 gram/acre	
Refine SG + MCPA ester 500 ^{2,4}	Refine SG: 12 g/acre + MCPA ester 500: 0.23 - 0.285 L/acre	
Tilt 250 E (fungicide)	101 - 202 mL/acre	

¹ Always consult the label of the broadleaf herbicide prior to use. ² Addition of surfactants other than Adigor adjuvant are not required. ³ Suppression only on green foxtail. ⁴ A reduction in barnyard grass control may be observed when Axial is tank mixed with these broadleaf herbicides.

Application Information

How to Apply: With ground equipment or aircraft.

Water volume: 20 - 40 L/ac- ground, a minimum of 12.1 L/ac by aircraft.

Application Tips

For optimum control, apply Axial 100 EC herbicide to actively growing weeds, ideally at the 2 - 3 leaf stage. An early application will maximize crop yields by reducing weed competition. Weeds emerging after application of Axial 100EC herbicide will not be controlled. Weed control following application of Axial 100 EC herbicide alone, or in combination with broadleaf weed herbicides, can be reduced or delayed under stress conditions such as drought, heat, insufficient fertility, flooding or prolonged cool temperatures. Grass escapes or re-tillering may occur if application is made during prolonged stress conditions. Optimum weed control will be obtained if application of Axial 100 EC herbicide is delayed until the stress conditions have ended, and weeds are once again actively growing. Do not apply to crop that is stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

Aerial Application: Apply AXIAL 100EC Herbicide alone or in tank mixes (ONLY with the recommended tank mix partners that are registered for aerial use) in no less than 12 litres of water per acre.

How it Works

Axial 100EC herbicide is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Thorough coverage of the plants is essential for consistent control.

Expected Results

Actively growing susceptible grasses stop growing within 48 hours of treatment. Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within one to three weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and control three to five weeks after application.

Restrictions

Rainfall: Axial 100 EC herbicide alone can be used one hour before rainfall.

Grazing: Observe a minimum of 7 days before grazing livestock on crops treated with Axial 100 EC herbicide.

Pre-harvest interval: 60 days after treatment for grain and straw and 30 days after treatment for hay.

Re-cropping: For fields treated with Axial 100EC herbicide, no crop may be seeded until the following year. There are no crop rotation limitations the year following application of Axial 100EC herbicide.

Axial 100 EC (cont'd)**Environmental Precautions**

This product is toxic to aquatic organisms and non-target terrestrial plants. Leave 1 metre between the downward edge of the boom and sensitive terrestrial habitats of less than 1 metre depth. Axial 240 EC may otherwise be applied up to the edge of fresh water habitats 1 metre deep or greater.

Toxicity

Acute Oral LD₅₀ (rat) = >3,129 mg/kg; Acute Dermal LD₅₀ (rat) = >2,000 mg/kg.

Storage

Store the product in closed, original container in a well ventilated room.

Banvel II/Oracle Dicamba/ Hawkeye Power



Warning Irritant Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Banvel II (PCP# 23957)	BASF Canada	Dicamba: 480 g/L	Solution	2 x 10 L jugs, 1000 L bulk
Oracle Dicamba (PCP# 26722)	Adjuvants Plus Inc.	Dicamba: 480 g/L	Solution	2 x 10 L jug
Hawkeye Power (PCP# 29223)				10 L

Crops and Staging

Crop	Stage	Rate	Acres to treat per 10 L jug
Barley*	2 - 5 leaf	93 - 117 mL/acre	107.5 - 85
Spring wheat, including durum*			
Winter wheat*			
Oats*			
Spring rye*	2 - 3 leaf	93 - 117 mL/acre	107.5 - 85
Field corn	Emergence to 5 leaf up to 20 cm Use 20 - 50 cm use drop nozzles	242 mL/acre	41.0
Canaryseed*	3 - 5 leaf	117 mL/acre	85
Seedling grasses**	2 - 4 leaf	93 - 117 mL/acre	107.5 - 85
Red fescue	Seedlings: up to 5 cm. Established: up to flag leaf	243 mL/acre	41.0
Pasture	Established: actively growing	0.85 - 1.48 L/acre	11.7 - 6.8
Rangeland			

Banvel II/Oracle Dicamba/Hawkeye Power (cont'd)

Crop	Stage	Rate	Acres to treat per 10 L jug
Pre-seed weed burndown (cereals) Banvel II + glyphosate (360 formulation)	Apply according to leaf stage	Banvel II: 127 mL/acre + glyphosate: 0.38 L/acre + surfactant	79
Chem-fallow (Banvel + glyphosate)	2 to 4-leaf stage of weeds	Banvel II: 117 - 243 mL/acre + glyphosate: 0.38 L/acre + surfactant (0.5% V/V)	41 - 85
Chem-fallow (Banvel II + 2,4-D)	Apply according to leaf stage	Banvel II: 93 - 127 mL/acre + 2,4-D amine 500: 0.45 L/acre	
Fall stubble	Apply according to leaf stage	1.0 L/acre	10
Fall stubble (Banvel II + glyphosate)	Apply according to leaf stage	Banvel II: 0.5 L/acre + glyphosate: 0.38 L/acre	20
Brush control: alder, poplar, cherry, prickly rose, western snow berry, wolf willow, wild rose	Apply in spring or early summer, when brush species are under 2 metres tall.	0.84 - 1.47 L/acre	

* Should be tank mixed with 2,4-D or MCPA or any other registered tank mixed partner for broad-spectrum weed control.

** Seedling grasses includes creeping red fescue, crested wheatgrass, intermediate wheatgrass, meadow fescue, meadow foxtail, orchard grass, pubescent wheat grass, slender wheatgrass, smooth brome grass, streambank wheatgrass, tall fescue, tall wheatgrass, timothy.

Weeds Controlled

Banvel II/Oracle/Hawkeye applied alone at 93 - 117 mL/acre only

Canada thistle (top growth only)
cleavers (high rate only)
corn spurry

cow cockle
green smartweed
lady's thumb

perennial sow-thistle (top growth only)
tartary buckwheat
wild buckwheat

Tank Mixes

Tank mix partner	Tank mixture rate	Additional weeds controlled including the above mentioned
Barley, spring wheat, winter wheat, rye (only registered with 2,4-D), oats (only MCPA), seedling grasses (only 2,4-D)		
2,4-D Amine 500 or MCPA Amine 500	Banvel/Oracle/Hawkeye @ 93 mL/acre + 2,4-D amine @ 340 mL/acre or MCPA Amine @ 340 mL/acre	2 - 5 leaf stage, burdock, Canada thistle, cocklebur, flaxweed, green smartweed, hemp nettle, kochia, redroot pigweed, Russian pigweed, Russian thistle, shepherd's-purse, volunteer canola (1 - 4 leaf) wild radish
Barley spring and winter wheat, oats		
MCPA K-salt	Banvel/Oracle/Hawkeye @ 93 mL/acre + MCPA-K salt @ 440 mL/acre	2 - 5 leaf stage, all of the above weeds
Barley and spring wheat		
Sencor	Banvel/Oracle/Hawkeye @ 93 mL/acre + Sencor @ 110 - 170 mL/acre	2 - 3 leaf stage. All of the above weeds plus chickweed, corn spurry, stinkweed.
Ally	Banvel /Oracle/Hawkeye @ 93 mL/acre + Ally @ 2 g/acre	2 - 5 leaf stage. All of the above weeds plus volunteer canola.
Prior to seeding in cereals (wheat, barley, rye, oats and corn only)		
Glyphosate	Banvel /Oracle/Hawkeye @ 127 mL/acre + glyphosate @ 378 mL/acre + surfactant @ 0.5% v/v	Weeds as listed on the glyphosate label plus the Banvel/Oracle label.

Application Information

How to Apply: With: Aircraft or ground equipment.

Banvel II/Oracle Dicamba/Hawkeye Power (cont'd)

Water volume: Ground: Cereals, seed grasses: 45 L/ac. Corn: 90 - 140 L/ac. **Summerfallow/stubble (thistles):** 45 - 90 L/ac. Reduced tillage: 20 - 45 L/ac.

Pastures, rangeland grasses: 45 - 90 L/ac. Prior to seeding cereal (pre-seeding weed burndown): 20 - 45 L/ac.

Air: 8 L/ac minimum.

Application Tips

Canada thistle and Perennial Sow-thistle Control in Summerfallow and Stubble: Apply before thistles reach early bud stage (15 - 25 cm tall). For the most effective control of Canada thistle, follow a long-term approach that includes in crop, post-harvest, and summerfallow treatments, in conjunction with tillage operations. If application is made after September 1, or if soil moisture levels are extremely low after application, crop injury may occur in the spring following application.

Perennial Rosette Control in Summerfallow: For Canada thistle and/or perennial sow thistle only, perform the final tillage operation the last week of July or first week of August. Allow thistles to regrow for a minimum of 4 weeks and apply when the majority of thistles have emerged. Apply before thistles reach early bud stage (15 - 25 cm tall) and at least 2 weeks prior to killing frost.

Best when crop is under good growing conditions and air temperature 10 - 25°C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast. Do not use on bentgrass. Apply only at recommended crop stage, otherwise, crop damage can occur.

How it Works

Absorbed through roots and leaves and translocated in phloem and xylem, disrupting the metabolism.

Expected Results

Weeds: Results may take 10 - 14 days to appear. Proliferation of tissues in plant causes twisting, bending of stem and leaf petioles; cupping of leaves; increase in root size; increase in fibrous roots.

Crops: Shortening of straw may occur in treated crops without adverse effects on yield. If applied at other than recommended crop stage, head and stem deformities may occur. Crops under stress from adverse environmental conditions may suffer a further setback. Crop injury may be offset by weed control obtained.

Restrictions

Rainfall: Rainfall more than 4 hours after application will not reduce effectiveness.

Re-cropping: When Banvel II/Oracle/Hawkeye is applied at 1 L/ac on fallow or stubble, grow only beans (white), cereals, corn (field, sweet) or soybeans the next year. After Banvel II/Oracle/Hawkeye (510 mL/ac) + Roundup (690 mL/ac) for thistle control, grow the above crops or canola. If application is after September 1 or if soil is dry subsequent to application, crop injury may occur next spring.

Grazing restrictions: Canaryseed: Use seed only as bird seed. Cereals, seedling grasses: follow as per grazing and haying restrictions. **Corn:** Do not graze or harvest for silage until 7 days after Banvel II/Oracle/Hawkeye alone or Banvel II/Oracle/Hawkeye + 2,4-D Amine; at least 12 weeks after other tank mixes.

Pastures, rangeland, non-crop area (meat animals): If treated vegetation has been consumed by meat animals within 30 days of Banvel II/Oracle/Hawkeye application, feed the animal with untreated diet for 30 days before slaughter. Meat animals may graze or feed on treated pasture 30 days after Banvel II/Oracle/Hawkeye application without restrictions on slaughter.

Grazing and hay restrictions (dairy cattle): (Days = time between treatment and grazing or cutting.)
Up to 500 mL/ac: 0 days, 501 - 930 mL/ac: 7 days, 931 mL/ac - 1.86 L/ac: 14 days, 1.87 - 2.87 L/ac: 30 days.

Environmental Precautions

Banvel II/Oracle/Hawkeye may cause injury to desirable trees and plants, particularly soybeans, flowers, fruit trees, ornamentals, peas, potatoes, tomatoes, and other broadleaf plants especially in their developmental and growing stage. Leave an adequate buffer zone between treatment areas and sensitive plants.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = formulated 2,629 mg/kg. May cause mild skin irritation and extreme eye irritation and swelling. Non-toxic to fish and birds.

Storage

If frozen, shake thoroughly before use. No activity is lost if completely resuspended.

Barricade

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Barricade SG (PCP#28622)	E. I. duPont Canada	Thifensulfuron methyl :25% + tribenuron methyl: 25 %	WSG	480 g bottle
Perimeter (PCP#29586)		Fluroxypyr: 180g/L	EC	6.48 L

40 acres per case.

Crops and Staging

Crop	Staging
Feed barley (do not use on Belevedere or Leger varieties)	2 - flag leaf stage
Wheat (spring and durum)	2 - flag stage

Weeds Controlled and Staging

Unless otherwise noted, apply to young and actively growing weeds that are less than 10 cm in height or width.

Canada thistle*
cleavers (1 - 4 whorl)
cow cockle
green smartweed
hemp nettle

*Suppression

kochia
lady's-thumb
lamb's-quarters
redroot pigweed
Russian thistle*

stinkweed
volunteer canola (excluding
CLEARFIELD varieties)
wild buckwheat (1 - 4 leaf)
wild mustard

Rate

Barricade SG: 12 g/acre.

Perimeter: 0.16 L/ac.

Surfactant: non-ionic surfactant (Agral 90, Ag-Surf or Citowett Plus at 0.2 L/100 L of spray solution).

Tank Mixes

None registered.

E.I. duPont supports the following mixes that are not on the Barricade label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: Horizon (240 EC & NG), Axial, Flucarbazone + 2,4-D Ester, Puma¹²⁰ Super, Puma Advance, Simplicity.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 22 L/ac (minimum).

Application Tips

Higher spray volumes needed with a dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Barricade left in the tank for more than 24 hours might have reduced effectiveness. When crop is under stress, application may result in crop injury such as temporary crop colour lightening or a slight height reduction. Clean sprayer immediately after application and use ammonia to deactivate Barricade.

How it Works

Absorbed through foliage. Inhibits cell elongation. Causes stem elongation, leaf cupping or curling.

Barricade (cont'd)**Expected Results**

Growth stops immediately. Discoloration of dying weeds may not be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce weed control.

Grazing: May not be grazed or fed to livestock within 77 days of application on wheat, 80 days on barley.

Pre-harvest Intervals: Allow 60 days between application and harvest.

Recropping: Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye or wheat can be seeded 10 months after application.

Environmental Precautions

Overspray or drift to important wildlife habitats, such as ponds, wetlands, streams, woodlots and shelterbelts, should be avoided. A 15 metre buffer zone should be established between the area to be sprayed and aquatic environments or terrestrial habitats listed above. Do not contaminate water when disposing of equipment washwaters. Do not contaminate irrigation ditches or water used for domestic purposes.

Runoff: Avoid runoff by using recommended buffer zones.

Toxicity

Barricade is a combination package of 2 products: Barricade SG and Perimeter: Barricade SG: Low oral toxicity. Oral LD₅₀ (rat) = > 5000 mg/kg. Perimeter: Moderate oral toxicity. Acute oral LD₅₀ (rat) = > 3,162 mg/kg. Eye irritant, skin irritant.

Storage

Store in a cool, dry place. May be frozen. If frozen, bring to room temperature and agitate before use. This product is COMBUSTIBLE. DO NOT store near heat or open flame.

Basagran/Basagran Forte

Caution Poison

Group 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Basagran (PCP # 12221)	BASF Canada	Bentazon: 480 g/L	Solution	2 X 9 L
Basagran Forte (PCP # 22006)				2 X 10 L

Note: Basagran Forte has a built-in adjuvant. Using Basagran requires the use of a surfactant, (not included in package).

Crops and Staging

Crop	Stage	Stage of crop for optimum weed control
Basagran and Basagran Forte		
Corn (grain, silage, sweet, seed)	No stage restriction	1 - 5 leaf stage
Dry common beans***	After 3rd trifoliate stage	3 - 5 trifoliate stage
Fababeans	After 3 - 4 leaf stage (10 cm tall)	Soon after 3 leaf stage
Flax (excluding low linolenic acid varieties with Basagran Forte)	When crop is 5 cm or higher	Soon after 5 cm height
Peas (field and processing)	After 3 pairs of leaves (or 3 nodes) are present	Soon after peas have 3 pairs of leaves form

Crop	Stage	Stage of crop for optimum weed control
Basagran and Basagran Forte		
Spring wheat (excluding durum)**†	No stage restrictions	2 - 4 leaf stage
Forage grasses for seed production (bromegrass, creeping red fescue, crested wheatgrass, meadow foxtail, orchard grass, timothy)†	1 - 7 leaf stage	2 - 5 leaf stage of seedling forage grasses
Forage legumes (seedling) for seed production* (alfalfa, alsike clover, red clover, sainfoin)†		
Forage legumes (established alfalfa for seed production)†	Prior to flowering	
Forage legumes (established sweet clover and sainfoin)†	7.5 - 25 cm high	After crop is 7.5 cm and before crop canopy closes
Forage millet and forage sorghum	3 - 6 leaf, prior to canopy closure	

** Basagran only at 0.4 L/acre. Must be tank mixed with 2,4-D (no adjuvant required).

*** Dry common beans varieties including but not limited to: white, kidney, black, pinto, great northern, pink, small red, cranberry, otebo) and most snap common beans including snap beans. Not all dry bean varieties have been tested for tolerance to Basagran. Test a small area of new variety for tolerance prior to field scale use.

†Only registered for use with Basagran.

Weeds, Rates and Staging

Weeds controlled	Recommended stage
Basagran at 0.91 L/acre + Assist or XA Oil Concentrate at 0.4 - 0.8 L/acre	
buttercup	5 - 10 cm
cleavers	4 - 8 cm
cocklebur	17.5 - 30 cm
common chickweed	1 - 3 weeks after emergence
common groundsel	5 - 10 cm
common ragweed	2.5 - 5 cm
corn spurry	2.5 - 10 cm
yellow nutsedge	15 - 20 cm
giant ragweed	5 - 15 cm
hairy galinsoga	5 - 7.5 cm
hairy nightshade	0.5 - 2 cm
lady's-thumb (smartweed)	7.5 - 20 cm
lamb's-quarters	1.25 - 2.5 cm
purslane	2.5 - 5.0 cm
redroot pigweed(suppression)	1.25 - 3.75 cm
Russian thistle	2.5 - 7.5 cm
shepherd's-purse	10 - 25 cm
stinkweed	5 - 15 cm
stork's-bill	4 - 10 cm
volunteer canola	10 - 15 cm
wild mustard	12.5 - 25 cm
wild radish	2.0 - 5 cm

Basagran/Basagran Forte (cont'd)

Weeds controlled	Recommended stage
Basagran at 0.71 L/acre + Assist or XA Oil Concentrate at 0.4 - 0.8 L/acre	
Canada thistle (suppression only)	15 - 20 cm
field bindweed (suppression only)	2.5 - 6 cm
yellow nutsedge	15 - 20 cm
volunteer canola (field peas only) @.4L/acre	up to 4 leaf stage

Tank Mixes

Tank mix partner	Crop	Basagran
2,4-D Amine or Ester (500mL AI/L) @ 300 - 400 mL/acre	Spring wheat	400 mL/acre
Assure II @255 mL/acre	Pinto, pink, small red, Great Northern beans	710 - 910 mL/acre
Solo (11.7 g/acre) + 28-0-0 UAN(0.8 L/acre)	Dry beans only	Basagran Forte (505 mL/acre)

Note: Do not add adjuvant to this tank mixture. Do not apply this tank mixture by air.

Application Information

Basagran may be applied with ground equipment or by air. Basagran Forte can only be applied by ground equipment.

Water Volume: 40 - 160 L/acre.

Application Tips

Do not apply to crops that have been stressed as crop injury may result. Best results are when weeds are young and actively growing. Apply Basagran to stork's-bill at the 2 - 6 leaf stage and to cleavers at the 1 - 3 whorl stage.

How it Works

Contact herbicide that interferes with photosynthesis. In resistant plants, bentazon metabolizes to a non-toxic material. Uptake into the plant occurs primarily through the leaves. Thorough coverage of foliage is important for consistent weed control.

Expected Results

Weeds: Weeds turn yellow initially and then brown, usually within 2 weeks. Crops: Yellowing, bronzing, speckling or burning occurs sometimes. The crop usually outgrows the condition within 10 days. Poor results may be expected when weeds are beyond recommended growth stage, when spray coverage is poor or under poor growing conditions (cool weather conditions or drought).

Restrictions

Rainfall: Rainfall within 6 - 8 hours of application may reduce activity.

Grazing: Do not graze treated fields or cut treated forage for silage or hay; sufficient data are not available to support such use.

Re-cropping: No restrictions the year after treatment.

Environmental Precautions

Basagran/Basagran Forte is toxic to aquatic organisms, including fish. Do not apply this product directly or contaminate aquatic habitats or water sources.

Leaching: The use of Basagran and Basagran Forte may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) or the water table is shallow.

Drift: Avoid drift into non-target areas.

Toxicity

Ingestion: moderate toxicity: Acute oral LD₅₀ (rats) = 2,063 mg/kg. Slightly toxic to fish. Non-toxic to birds and bees.

Storage

Store in a heated place; freezing will not affect activity.

Benchmark



Caution Poison

Group 2, 6

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Benchmark A (PCP # 28787)	Dow AgroSciences Inc.	Florasulam: 50 g/L	Suspension	Case package: 1.16 L. Bulk: 4 x 8 L
Benchmark B (PCP # 28876)		Bromoxynil: 235 g/L	Emulsifiable concentrate	Case package: 2 x 9.7 L. Bulk: 4 x 97.1 L

40 acres treated per small package; 800 acres treated with bulk package or 200 acres per jug/drum.

Crops and Staging

Crop	Stage
Barley	2 - 6 leaf
Wheat (including durum)	

Weeds, Rate and Staging

Benchmark A: 40 mL/acre. **Benchmark B:** 485 mL/acre

Up to 4 leaf stage. Common groundsel, lamb's-quarters and tartary and wild buckwheat can be controlled up to the 8 leaf stage, but control is best when plants are smaller.

American nightshade	common groundsel	kochia**	shepherd's-purse
annual sow-thistle (suppression)	lamb's-quarters	lady's-thumb	stinkweed
bluebur	common ragweed	pale smartweed	volunteer canola*
cleavers	cow cockle	perennial sow-thistle**** (suppression)	wild buckwheat
cocklebur	green smartweed	redroot pigweed (suppression)	wild mustard
common chickweed	hemp-nettle (suppression)	Russian thistle**	tartary buckwheat

*Including herbicide-tolerant canola varieties except CLEARFIELD canola.

**Apply before plants are 5 cm high.

***Apply before plants are 8 cm high.

****Application made at advanced leaf stage will reduce product effectiveness.

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate (mL/acre)	Adjuvant and rate	Additional weeds controlled
Horizon 240 EC	Wheat (spring and durum)	93 mL/acre	Score @0.8% v/v	Wild oat and green foxtail
Puma ¹²⁰ Super	Wheat (spring and durum)	156 mL/acre and 312 mL/acre	Not required	Green foxtail(low rate) and green foxtail and wild oats (high rate)
Simplicity	Wheat (spring and durum)	150 mL/acre and 200 mL/acre	Not required	High rate: wild oats, other grass weeds and labeled broadleaf weeds low rate: wild oat control at < 75 plants/metre ²

Application Information

How to Apply: Ground only. Do not apply by air. Water Volume: 40 L/acre.

Benchmark (cont'd)**Application Tips**

Do not apply to crops underseeded with legumes. Apply Benchmark tank mix to main flush of broadleaf weeds. Apply when weeds are actively growing (2 - 4 leaf stage). Warm, moist conditions that promote active weed growth, small weed size, competitive crop and good growing conditions after application will optimize the weed control. Stressed weeds may not be adequately controlled or suppressed, and regrowth may occur. For best results, ensure adequate spray coverage of target weeds. Only weeds that have emerged at time of application will be controlled. If foliage of the weed is wet at time of application, control may be reduced.

How it Works

The florasulam component inhibits the ALS enzyme in plants, resulting in a rapid halt in growth followed by yellowing and reddening of the foliage, followed by death of susceptible weeds. The bromoxynil portion is a contact herbicide that inhibits photosynthesis and plant respiration causing plant death.

Expected Results

Weeds susceptible to florasulam will stop growing almost immediately. The weeds turn yellowish or reddish. Symptoms such as yellowing or red colouration may not be noticeable for 1 or 2 weeks. Small burnt spots on leaves of weeds susceptible to bromoxynil can appear within hours. Warm, moist conditions, small weed size and competitive crop will optimize weed control provided by Benchmark tank mix.

Restrictions

Rainfall: Do not apply if rainfall is forecast for time of application.

Grazing: Livestock may be grazed on treated crops 7 days following application.

Pre-harvest Intervals: Do not harvest the treated crop within 60 days after application.

Re-cropping: Fields previously treated with Benchmark herbicide can be seeded the following year to barley, canola, peas, wheat or fields can be summerfallowed. Do not use in successive years at the same site.

Environmental Precautions

Florasulam is highly toxic to aquatic organisms, including fish. Florasulam is also slightly toxic to birds. A buffer zone of 30 metres is required between sensitive aquatic and terrestrial habitats and the treated area. Do not apply during periods of dead calm or when winds are gusty.

Leaching: Benchmark has potential to leach. Do not apply excessive irrigation.

Toxicity

Benchmark A (florasulam): Ingestion: practically non-toxic. Acute oral LD_{50} (rats) = >5,000 mg/kg. Intake of a large dose may cause convulsions, sudden collapse or coma. It can be adsorbed through the skin. It is very toxic to fish. Benchmark B (bromoxynil): Ingestion: toxic. Acute oral LD_{50} (rabbit) = > 505 mg/kg. Slightly irritating to skin. Eye irritation: moderate.

Storage

Store in dry, heated storage. If products are frozen, bring up to room temperature and agitate before use.



Warning Poison

Betamix/Betamix B

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Betamix (PCP # 19652)	Bayer CropScience Inc.	Phenmedipham: 75 g/L + desmedipham: 75 g/L	Emulsifiable concentrate	10 L
Betamix B (PCP # 28650)		Phenmedipham: 153 g/L + desmedipham: 153 g/L		10 L

Crops and Staging

Apply to sugar beet past the 2-true leaf stage.

Weeds and Staging

Weeds controlled at cotyledons to 4-leaf stage:

green foxtail	mustard	redroot pigweed	yellow foxtail
kochia	nightshade	stinkweed	
lamb's-quarters	ragweed	wild buckwheat	

Rate

Betamix: 1.0 - 4.45 L/ac, Betamix B: 0.47 - 1.9 L/ac. Select rate based on formulation used as a broadcast equivalent in a maximum of 42 litres of water for each litre of Betamix. Use low rate on early cotyledon beets and high rate on beets with at least 4 fully expanded leaves. Repeat application for improved weed control.

Tank Mixes

Tank mixture partner	Tank mixture rate	Remarks
Upbeet	Betamix @ 0.7 - 1.4 L/acre Plus Upbeet @ 14 - 28 g/acre	Do not add adjuvant. A second application should be made 5 - 10 days later or as weeds germinate.
Upbeet	Betamix B @ 0.36 L/acre Plus Upbeet @ 14 - 28 g/acre	

Application Information

How to Apply: Ground only. Do not apply by air. Water Volume: 40 - 80 L/acre for Betamix B, 80 - 160 L/ac for Betamix.

Application Tips

Avoid spraying until mid-afternoon when daytime temperatures will exceed 22°C. High humidity increases efficacy. Best results are obtained with repeat applications of the lowest rate commencing when the first weeds emerge. Do not apply during periods of dead calm. Avoid application when winds are gusty.

How it Works

Absorbed through leaves. Sharply inhibits rate of assimilation of CO₂ in treated plants within 6 hours. Resistant species (sugar beets) begin recovery in this time while susceptible species do not.

Expected Results

Under warm conditions, weed kill is complete in 4 - 7 days. Cool conditions require longer periods of up to 2 weeks.

Restrictions

Rainfall: Rainfall within 6 hours of application may reduce weed kill.

Grazing: Do not graze treated crops or use for livestock feed; sufficient data are not available to support such use.

Pre-harvest Interval: Do not apply to sugar beet later than 60 days prior to harvest.

Recropping: Recropping restrictions not specified on the label.

Environmental Precautions

This product is toxic to non-target terrestrial and aquatic plants, fish and other aquatic organisms. Avoid contamination of aquatic habitats by use the recommended buffer zones.

Toxicity

Phenmedipham. Acute oral LD₅₀ (rat) = > 8,000 mg/kg. Desmedipham: Acute oral LD₅₀ (rat) = > >10,250 mg/kg. Toxic to fish.

Storage

Do not store below 0°C.

Broadband



Warning Irritant

Group 1, 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Broadband (PCP # 29138)	Syngenta Crop Protection Canada Inc.	Pinoxaden: 92.7 g/L + florasulam: 7.7 g/L	EC	10.53 L + 11.3L (Adigor), 84.24 L + 90.4 L (Adigor)

40 acres treated per 10.53 L jug.

Crops and Staging

Apply to barley and spring wheat (excluding durum) at 1 leaf to flag leaf stage.

Weeds and Staging

Grassy weeds: 1 - 6 leaf stage prior to 4th tiller	
barnyard grass green foxtail proso millet volunteer oats	volunteer canarygrass wild oats yellow foxtail

Broadleaf weeds: 1 - 6 leaf stage		
annual sow-thistle (suppression) cleavers common chickweed hemp-nettle (suppression) lady's-thumb	perennial sow-thistle (suppression)* red-root pigweed (suppression) shepherd's-purse smartweed stinkweed	wild buckwheat wild mustard volunteer canola (except CLEARFIELD canola)

MCPA Ester or Curtail M tank-mix to Broadband will control CLEARFIELD Canola

* Applications made at advanced leaf stages will reduce product effectiveness.

Rate

Broadband: 263 mL/acre + Adigor adjuvant: 283 mL/acre.

Tank Mixes

Tank mix products	Crop	Rate of Broadband	Notes and additional weeds controlled
MCPA ester LV 500 @ 283 mL/acre + Adigor @ 268 mL/acre	Spring wheat (excluding durum) and barley	Broadband @ 263 mL/acre	lamb's-quarters, ball mustard, common ragweed, hemp nettle, Canada thistle(top growth control), stork's-bill, flaxweed, burdock, Russian thistle, prickly lettuce, dandelion(suppression)
Curtail M @ 606 mL/acre + Adigor @ 268 mL/acre			All of the above plus control of Canada thistle and annual and perennial sowthistle.
Tilt @ 250 - 500 mL/acre			

Application Information

How to Apply: Ground only. Do not apply by air. Water Volume: 20 - 40 L/acre.

Application Tips

For optimum results, apply Broadband herbicide to actively growing weeds. Weeds emerging after application of Broadband will not be controlled. Do not apply to crops stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

How it Works

Broadband herbicide is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems of target weeds. It must be applied early post emergence to the main flush of actively growing annual broadleaf and grass weeds. Thorough coverage of the plants is essential for consistent control.

Expected Results

Broadband is a systemic, post-emergence herbicide. Broadband herbicide stops growth of susceptible weeds rapidly. Actively growing, susceptible grass and broadleaf weeds stop growing within 48 hours of treatment; however, typical symptoms (discolouration) of dying broadleaf weeds may not be noticeable for 1 to 2 weeks after application. Depending on species, growing conditions and crop competition, leaves and growing points of annual grass weeds turn yellow within one to three weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and control 3 to 5 weeks after application.

Restrictions

Rainfall: Broadband alone can be used one hour before rainfall.

Grazing: Wait a minimum of 7 days before grazing livestock on treated crops.

Pre-harvest Intervals: Observe minimum interval to harvest of 60 days after treatment for grain and straw and of 30 days after treatment for hay.

Re-cropping: On fields sprayed with Broadband, no crop may be seeded until the following year. There are no crop rotation limitations the year following application of Broadband.

Environmental Precautions

The active ingredient, pinoxaden, is non-toxic to birds and insects (bees) and slightly toxic to aquatic organisms. The active ingredient, florasulam, is practically non-toxic to insects (bees), aquatic invertebrates (water flea), fish, and is non-toxic to slightly toxic to birds. Avoid contamination of water supplies or aquatic habitats. Observe buffer zones specified on the label.

Toxicity

Acute oral toxicity: LD_{50} (rat) = 3,129 mg/kg. Broadband herbicide contains materials that may cause severe pneumonitis if aspirated.

Storage

Store the product in closed, original container in a well ventilated room.

Buctril M/Logic M/ Mextrol 450/Badge



Warning Poison

Group 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Buctril M (PCP # 18022)	Bayer CropSciences	Bromoxynil: 280 g/L + MCPA 280 g/L	Emulsifiable concentrate	8 L, 128 L
Logic M (PCP # 28109)	IPCO	Bromoxynil: 225 g/L + MCPA 225 g/L		2 x 10 L, 115 L
Mextrol 450 (PCP # 26999)	Nufarm Agriculture	Bromoxynil: 225 g/L + MCPA 225 g/L		2 x 10 L, 100 L, 450 L
Badge (PCP # 16164)	MANA Canada			2 x 10 L, 500 L

Buctril M/Logic M/Mextrol 450/Badge (cont'd)

Crops and Staging

Crop	Staging
Field crops	
Barley, oats, spring wheat including durum	2 leaf to early flag leaf
Winter wheat - fall or spring applied	2 to 4-leaf stage in the fall or from the time growth commences to the early flag leaf stage in the spring
Fall rye	When growth commences to the early flag leaf stage in the spring.
Perennial cereal rye*	Seedling: 2 to 4-leaf stage in the fall or from the time growth commences to the early flag leaf stage in the spring. Established: 2-leaf until early flag leaf stage
Canary seed	3 to 5 leaf stage
Flax (including low linolenic acid varieties)	5 cm high up to the early flower bud stage. Best tolerance occurs when flax is 5 - 10 cm high
Corn	4 - 6 leaf stage
Seedling forage grasses (seed production)	
Bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass meadow fescue, meadow foxtail, orchard grass, reed canarygrass, Russian wild rye, slender wheatgrass, tall fescue, tall wheatgrass, timothy, meadow bromegrass, streamback wheatgrass	2 - 4 leaf stage
Established grasses (not underseeded to legumes)	
Timothy (for seed or hay)	3 - 6 leaf stage

* Application onto perennial fall rye registered with Buctril M only.

Weeds and Staging

Seedlings up to 4 - leaf stage	Seedlings up to 6 - leaf stage	Seedlings up to 8 - leaf stage	Suppression
American nightshade ball mustard bluebur cocklebur cow cockle* flixweed green smartweed kochia** lady's-thumb night flowering catchfly pale smartweed redroot pigweed Russian thistle** scentless chamomile*** shepherd's-purse volunteer canola volunteer sunflower	wild tomatoes	common groundsel common buckwheat common ragweed lamb's-quarters stinkweed tartary buckwheat wild buckwheat wild mustard wormseed mustard	Canada thistle perennial sow-thistle prickly lettuce†

* In normal conditions, cow cockle will be controlled up to the 4-leaf stage. Plants beyond this stage are unlikely to be controlled.

** Spray before plants are 5 cm high.

*** Spring annuals only.

† Prickly lettuce in winter wheat only, from the 2 - 12 leaf stage

Rates

Buctril M: 0.4 L/acre. Logic M, Mextrol 450, Badge: 0.5 L/acre

Tank Mixes

Not all tank mixes are registered with all products. Check labels for registered mixes.

Tank mix partners	Crop	Buctril M, Logic M, Mextrol 450, Badge	Crop stage/comments
MCPA amine, ester, K-salt (222 mL/acre at 500 g A.I./L formulation)	Spring wheat (including durum*), barley and oats	400mL/acre Buctril M; 500mL/acre Logic M, Mextrol 450, Badge	2 leaf until the early flag leaf stage
Achieve Liquid (200 mL/acre) + Turbocharge 0.5% v/v	Spring wheat (including durum) and barley	Same rate for all mixes	2 leaf until the early flag leaf stage
Ally (3 gm/acre) + non-ionic surfactant (0.5%v/v)			
Avenge (1.42 - 1.72 L/acre)	Spring wheat (excluding durum) and barley	Same rate for all mixes	2 - 6 leaf stage. Wild oats: 3 - 5 leaf stage
Puma Advance (412 mL/acre) or WildCat@156 - 312 mL/acre or Bengal @ 156 - 312 mL/acre with Badge or Cordon @ 156 - 312 mL/acre with Buctril M or Mextrol	Spring wheat (including durum) and barley	Same rate for all mixes	Wheat: 2 - 6 leaf stage plus 3 tillers Barley: 2 - 5 leaf stage plus 2 tillers
Refine SG 3.4 g/acre	Spring wheat (including durum) and barley	Same rate for all mixes	2 leaf - early flag for crop
Everest (17 gm/acre) + non-ionic surfactant 0.25% v/v)	Spring wheat, durum	Same rate for all mixes	2 - 4 leaf stage plus 2 tillers
Horizon (93 mL/acre) + Score (0.8% v/v) or Signal (93 mL/acre) + Signal Adjuvant (0.8 % v/v)	Spring wheat, durum	Same rate for all mixes	2 flag leaf stage
Axial (243 mL/acre) + Adigor (283 mL/acre)	Spring wheat	Same rate for all mixes	2 - 6 leaf stage prior to 4 th tiller
Atrazine (450 - 900 mL/acre)	Corn	Same rate for all mixes	4 - 6 leaf stage
Select or Centurion (76 mL/acre) + Amigo (500 mL/acre)	Flax	Same rate for all mixes	5 - 10 cm high
Poast Ultra (130 - 190 mL/acre) + Merge adjuvant (1 L/acre)	Flax	Same rate for all mixes	5 - 10 cm high

Application Information

How to Apply: Ground and air (for wheat, barley and oats only).

Water Volume: Ground: 20 L/acre or more. Corn: 80 - 120 L/acre. Seedling grasses: 60 L/acre. Established timothy: 60 L/acre. Air: 8 L/acre or more.

Application Tips

Avoid spraying during a severe drought. Under conditions of high temperature and humidity, slight discolouration of cereals may occur but no effect on crop yields. Flax is less tolerant than cereals; therefore, do not spray flax in hot, humid weather when daytime temperatures are over 25 - 29°C. Best results are achieved when weeds are sprayed in seedling stage, with good spray coverage. Corn: Buctril M at 400 mL/ac (or Mextrol/Badge/Logic M at 500 mL/ac)

Buctril M/Logic M/Mextrol 450/Badge (cont'd)

as an overall spray only up to 6 leaf stage. Buctril M + Atrazine (or Mextrol/Badge/Logic M + Atrazine) for a broader spectrum of weed control. Cultivation after application is not recommended.

How it Works

Bromoxynil is a contact type herbicide; therefore, good spray coverage is essential. Inhibits photosynthesis and plant respiration. MCPA is absorbed through leaves and is readily translocated in the plant.

Expected Results

Small burnt spots on the leaf can appear within hours; death takes up to 2 weeks. Poor results may be expected if poor coverage. Poor penetration through dense crop canopy.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce weed control.

Grazing: Do not graze or harvest for greenfeed until 30 days after treatment.

Pre-harvest Interval: Do not cut treated crops for forage until 30 days after application.

Re-cropping: No restrictions.

Environmental Precautions

Buctril M/Badge/Logic M/Mextrol 450 contains a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Observe buffer zones specified on the label under Direction for Use. Avoid contamination of aquatic systems during application by using recommended buffer zones.

Runoff: Consider site characteristics and conditions to prevent runoff. Use of a buffer strip of untreated vegetation between the treated area and sensitive sites.

Leaching: Leaching is possible with coarse textured soils or high water tables.

Toxicity

Acute oral LD₅₀ (rabbit) = > 505 mg/kg. Slightly irritating to skin.

Storage

Store the product in closed, original container in a well ventilated room.



Warning Poison

Calmix Pellets

Group 4, 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Calmix Pellets (PCP # 9342)	Nufarm Agriculture Inc.	Bromacil: 3% + 2,4-D: 5%	Granules	5 kg bags

Crops: Non-crop areas. Do not use in residential areas or on driveways.

Weeds Controlled, Rates and Timing

Weeds	Rate per 100 m ²	Timing
Annual weeds and perennial seedlings	2.5 kg	May be applied during growing season, but to prevent growth, apply in fall or early spring
Shallow-rooted perennials	3.75 kg	
Heavy perennial growth	4.5 kg	
Spot treatment:	37.5 g/metre ²	
Spot treatment around power poles	Treat at 225 g for 1.25 m around each pole (approximately 5.0 metres ²)	

Application Information

How to Apply: With Calmix spreader or shaker. Do not apply by hand. Do not apply by air.

Application Tips

Do not use near lawns or flowerbeds. Do not apply closer than 1.5 times the height of desirable trees, ornamentals or plants. Roots from large trees may extend well beyond the height of the tree and may extend beneath areas to be treated. Be cautious where trees are in close proximity to the treatment site. Do not apply on slopes where water erosion may carry chemical onto areas of desirable vegetation. Do not contaminate water used for irrigation or other domestic uses.

How it Works

Systemic action, enters plant via roots.

Expected Results

Vegetation turns brown and dies. No new growth will appear, resulting in bare ground. Rapidity and duration of control will depend on amount of chemical applied, soil type and environmental conditions. Poor results may be expected if inadequate application rates, soil erosion removes chemical from treated area when applied on slopes or insufficient rainfall to activate chemical.

Restrictions

Rainfall: Moisture will activate and carry the herbicide into the root zone.

Movement in Soil: Once fixed in the soil, there is very little lateral movement. Pellets and granular can be carried by erosion.

Environmental Precautions

Toxic to small mammals, birds, aquatic organisms and terrestrial plants. This product will harm broadleaved and grass plants in the vicinity of the treatment area. Do not apply to exposed roots of trees and ornamentals.

Runoff: Use a buffer strip between treated area and sensitive, non-target sites by using the recommended buffer strip.

Leaching: This product may leach in coarse textured soils or where there is a high water table.

Other Restrictions: Do not use in residential areas. Do not make more than one application per year. Do not apply on slopes where water erosion may carry the chemical onto areas of desirable vegetation. Workers must not handle more than 30 kg of Calmix Pellets Weed Killer and Soil Sterilant per day (sufficient to treat 667 M² day at the highest rate of 4.5 kg/100 M²).

Toxicity

Bromacil: Acute oral LD₅₀ (rat) = 1,650 mg/kg. Slightly irritating to skin. 2,4-D: Acute oral LD₅₀ (rat) = 699 mg/kg. Calmix Pellets are slightly toxic to fish. Non-toxic to birds. May cause burns and may be absorbed through the skin.

Storage

Store in dry areas.

Casoron G-4

Group 20

Formulations

Product	Company	Active ingredient	Formulation	Container size
Casoron (PCP # 12533)	Chemtura Chemical	Dichlobenil: 4%	Granules	2 kg, 3 kg, 15 kg

Casoron G-4 (cont'd)**Crops**

Shelterbelts, windbreaks and hedgerows consisting of the following

arborvitae	crabapple	heather honeysuckle	poplars
ash	fruit bearing trees (established - at least 1 year old.)	juniper	rose
birch (cutleaf-weeping)		lilac	spirea
boxwood	elm	linden	willow
caragana	euonymus (burning bush)	locust	
cedar (eastern red, white)	forsythia sp	mock orange	

Note: Do not use on shelterbelts consisting of mugo pine, fir, hemlock and spruce. Do not use in or near greenhouses. Do not use on light sandy soil.

Weeds and Staging

Annuals: Apply to well prepared, weed-free soil in early spring or late fall before annual weed seeds have germinated. If annual weeds have started to germinate before application, cultivate to remove them. Do not apply until 4 weeks after transplanting any crop.

annual bluegrass	foxtail	mustard	shepherd's-purse
artemisia*	groundsel	pigweed	smartweeds
bindweed*	horsetail	plantain	sow thistle
Canada thistle*	knotweed	purple loosestrife	spurge
chickweed	kochia	purslane	vetch*
dandelion*	lamb's-quarters	quackgrass*	wild buckwheat*

*Controlled with higher rates with late fall application.

Perennials: Apply in fall (October 15 until soil freeze-up) on crops established for at least 1 year.

Note: Quackgrass and artemisia in established woody ornamentals: apply in fall and again in the early spring before May 1.

Raspberries: Apply in late fall but before soil freeze-up. Do not cultivate or work into the soil. Do not apply in spring as injury may occur.

Tank Mixes

None.

Rate

Annual weeds: 45 - 70 kg/ac.

Quackgrass, artemisia in woody ornamentals: 60 kg/ac in fall; 60 kg/ac again in spring.

Quackgrass, thistles, bindweed in woody ornamentals: 91 - 111 kg/ac.

Raspberries: 71 kg/ac. Saskatoon: 44.4 - 71 kg/acre.

Application Information

Casoron can be spread on the soil surface by hand, using small hand-held or backpack equipment, or by larger and tractor-mounted spreaders. Do not apply by air.

Application Tips

Do not apply until 4 weeks after transplanting any crop. Casoron should be applied when the soil temperature is cool. Air temperatures should be less than 15°C. Applying at higher temperatures may reduce its herbicidal activity. Casoron will stay in the upper 10 cm of soil and will not harm established plants with a well developed root system below this herbicide barrier. Do not use in seedbeds, transplant, or cutting beds or in greenhouses. Do not apply until 6 months after rooting of cuttings in the field.

How it Works

Casoron inhibits cell growth at the growing points or meristematic tissues of the plant. Weed germination and growth initiation are strongly affected. Water is necessary to move the compound into the soil. Snowmelt or rain after the application moves Casoron into the soil. Casoron inhibits germination but acts primarily on growing points and root tips.

Expected Results

Growth of emerging shoots of some perennials controlled. Tolerant crops are unaffected if roots do not come in contact with Casoron in the upper layers of the soil.

Restrictions:

Grazing: Do not graze livestock in treated areas or use treated crops for forage or fodder; sufficient data are not available to support such use.

Horticultural/Nursery Use: Do not enter or allow worker entry into treated areas within 24 hours of application.

Re-cropping: Do not plant vegetables or other sensitive crops the year following soil treatment.

Environmental Precautions

Casoron is toxic to aquatic organisms and slightly toxic to fish. Avoid contamination of aquatic systems during application.

Runoff: Use a buffer strip of untreated vegetation between the treated area and the edge of water bodies to reduce risk of contamination.

Leaching: Warning. The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable and/or the water table is shallow.

Toxicity

Low oral toxicity. Acute oral LD₅₀ (rat) = 2,000 mg/kg.

Storage

Dry storage - not affected by frost.

CleanStart

Group 9, 14

Formulations

Product	Company	Active ingredient	Formulation	Container size
Aim EC (PCP# 28573)	Nufarm Agriculture	Carfentrazone-ethyl: 240 g/L	Emulsifiable concentrate	1 x 600 mL or 4 x 3.38 L
Credit (PCP # 25866)	Nufarm Agriculture	Glyphosate: 356 g/L	Solution	2 x 10 L

40 acres treated per case.

Crops and Staging

Pre-seed burndown prior to seeding the following crops

barley	corn (field, sweet)	peas (field)	sunflower	chemfallow
beans, dry	flax	potatoes	triticale	
buckwheat	lentils	rye	wheat	
canola	mustard	safflower		
chickpeas	oats	soybeans		

Weeds, Rate and Staging

Aim EC: 15 mL/acre + Credit: 0.5 L/acre. Weeds controlled up to 10 cm or 3 leaf rosette or less, unless specified, includes

Canada fleabane	kochia	Russian thistle	volunteer canola (all types)
chickweed	lamb's-quarters	shepherd's-purse	(1 - 3 leaf)
dandelions (spring seedlings only)	morning glory	smartweed	
field pennycress (stinkweed)	redroot pigweed	tansy mustard	
	round leaf mallow	velvet leaf	

Tank Mixes

None.

CleanStart (cont'd)**Application Information**

Apply with ground equipments only. Water volume: Minimum 40 L per acre.

Application Tips

Good growing conditions promote weed growth and enhance the activity of CleanStart. Weeds hardened off by cold weather or drought stress may not be controlled. Insufficient water volumes or coarse sprays may also reduce control levels.

How it Works

Credit is a non-selective herbicide that moves through the foliage into the roots and kills the entire plant. Aim EC is a contact herbicide; therefore, coverage of the weeds is essential for control.

Expected Results

Symptoms appear very rapidly (a few hours under bright conditions). Leaves of weeds take on a water-soaked appearance, followed by wilting and necrosis. Complete death occurs within a few days.

Restrictions

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-cropping: None.

Environmental Precautions

CleanStart is very toxic to non-target terrestrial and aquatic plants. Use of a buffer strip of untreated vegetation between the treated area and the edge of water bodies will reduce risk of contamination.

Toxicity

Credit: Very low acute toxicity. Acute oral LD_{50} (rat) = >5,000 mg/kg. Aim EC (carfentrazone): Very low acute mammalian toxicity. Acute oral LD_{50} (rats) = 4,077 mg/kg. . Very toxic to algae, and much less toxic to fish and aquatic organisms.

Storage

Store in a cool, dry place and avoid excess heat.



Caution Poison

Curtail M

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Curtail M (PCP #22764)	Nufarm Agriculture	Clopyralid: 50 g/L + MCPA ester: 280 g/L	Emulsifiable concentrate	2 x 8 L

Crops and Staging

Crop	Staging
Wheat, spring and durum, barley, oats	3 leaf to just before flag leaf
Timothy for seed production	3 leaf to flag leaf stage
Canaryseed	3 leaf
Flax	5 - 15 cm in height
Timothy for hay or forage (not to be used on export hay to Japan)	Established

Weeds, Rate and Staging

For best results, apply to actively growing weeds in the 1 - 4 leaf (seedling) stage and when Canada thistle is between 10 cm and up to but not including the early bud stage. Poor weed control may result under cool or dry conditions.

Low rate: 0.61 L/acre

burdock	field horsetail**	prickly lettuce	sunflower, annual
Canada thistle* (low infestations)	flixweed*** (2 - 4 leaf)	ragweed	volunteer sunflower
cocklebur	lamb's-quarters	shepherd's-purse*** (2 - 4 leaf)	wild mustard
	plantain**	stinkweed*** (2 - 4 leaf)	wild radish

High rate: 0.81 L/acre: all the weeds controlled at the low rates plus

annual sow thistle	kochia (suppression) (2 - 4 leaf)	smartweed
Canada thistle (medium to high infestations)	perennial sow-thistle**	tartary buckwheat
common groundsel	red root pigweed	wild buckwheat
dandelions***	Russian pigweed	volunteer canola
	scentless chamomile (2 - 4 leaf)	

* Season-long control, some growth may occur in the fall.

** Top growth control.

*** Spring rosettes only.

Tank Mixes

Tank mix partner	Crop	Curtail M
In spring wheat (including durum) and barley		
Achieve Liquid/Bison/Marengo @ 200 mL/acre + Turbocharge @ 0.5% v/v	Spring wheat, durum and barley	610 - 810 mL/acre
Assert 300 SC @ 526 mL/acre or 650 mL/acre		
Axial @ 243 mL/acre + Adigor @ 282 mL/acre	Spring wheat and barley	610 - 810 mL/acre
Puma ¹²⁰ Super/WildCat/ Bengal/Cordon @ 156 or 312 mL/acre or Puma Advance @ 412 mL/acre	Spring wheat, durum and barley	610 - 810 mL/acre
Horizon NG, NextStep NG @ 376 - 473 mL/acre (no adjuvant needed) or Foothills/Signal/Ladder/Legend @ 93 - 117 mL/acre + adjuvant		
Deploy/Nimble @ 8gm/acre or Refine SG @ 12 g/acre + non-ionic surfactant @ 0.2% v/v (for all products)	Spring and durum wheat	610 - 810 mL/acre
Everest @ 17 gm/acre + AgSurf or Agral 90 @ 0.5% v/v	Spring wheat	610 - 810 mL/acre

Application Information

How to Apply: With: Ground equipment only. Do not apply by air. Water volume: 40 - 60 L/acre.

Application Tips

When weeds are under extreme drought stress or showing effects of excessive moisture, control can be reduced or delayed. Weed escapes may occur under prolonged stress conditions or low fertility. Do not apply to weeds stressed for more than 20 days due to lack of moisture as unsatisfactory control can result. Ensure uniform spray coverage over the entire area of target weeds.

How it Works

Clopyralid is a growth regulator type of herbicide. It is primarily absorbed through the foliage and is translocated to all parts of the plant causing leaf and stem twisting and yellowing and then death. MCPA is a systemic herbicide for broadleaf weeds, which is translocated throughout the plant causing rapid undifferentiated growth, which usually results in the death of susceptible weeds.

Curtail M (cont'd)**Expected Results**

Weeds start to twist after spraying; then, plants turn brown and die. Difficult to control weeds such as Canada thistle and wild buckwheat stop growing, change colour to dark green and then turn yellow before they die. Death may not occur for 14 - 21 days after application. Some weak Canada thistle regrowth may occur by end of season.

Restrictions

Rainfall: Do not apply if rain is expected in 6 hours.

Grazing: Do not cut or graze treated fields of wheat, barley, oats or flax within 7 days after application.

Pre-harvest Intervals: Do not harvest wheat, barley, oats or flax within 60 days after application or within 7 days after application when harvesting for forage. Withdraw meat animals from treated fields at least 3 days before slaughter.

Re-cropping: Fields previously treated with Curtail M herbicide can be seeded to wheat, barley, oats and rye (not under-seeded to forage legumes), canola, corn, field peas, flax, forage grasses, mustard, sugar beets or can be summer-fallowed in the following year. Do not seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application, delay seeding field peas an additional 12 months (total 22 months following application).

Environmental Precautions

Curtail M contains a petroleum distillate that is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application and cleanup. Observe buffer zones specified under Directions For Use on the label.

Leaching: This product can leach under coarse soils and elevated water tables.

Toxicity

Clpyralid: Low acute mammalian toxicity. Acute oral LD_{50} (rat) = >2,000 mg/kg. Extremely toxic to fish. MCPA: Moderate acute toxicity. Acute oral LD_{50} (rats) = technical 700 - 880 mg/kg. May cause burns upon contact with skin and eyes, and it can be absorbed through the skin.

Storage

Store in cool (above 5°C) dry area.

Cypress

Caution Poison

Group 1, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Horizon W0 (PCP# 25477)	Viterro	Clodinafop-propargyl: 240 g/L	Emulsifiable concentrate	1.84 L
Target (PCP # 28028)		MCPA: 275 g/L + mecoprop-p: 62.5 g/L + dicamba: 62.5 g/L		10 L
Score (PCP # 12200)		Petroleum hydrocarbon: 83% + surfactant blend: 17%	Liquid	6.4 L

20 acres treated per case.

Crops and Staging

Spring wheat, including durum: 2 - 5 leaf stage.

Weeds and Staging**Grassy weeds**

Green foxtail: 1 - 5 true leaves on the main stem and prior to emergence of 3rd tiller

Wild oats: 1 - 6 true leaves on the main stem and prior to emergence of the 4th tiller

Broadleaf weeds: 2 - 5 leaf stage, unless otherwise stated

annual smartweeds	flixweed	lamb's-quarters	stinkweed
annual sow thistle	green foxtail	mustards	tartary buckwheat
cleavers (1 - 2 whorl)	hemp-nettle (before 2nd pair of leaf)	night-flowering catchfly	volunteer buckwheat
common chickweed	knotweed	prostrate pigweed	volunteer canola
common ragweed	kochia	redroot pigweed	volunteer sunflower
corn spurry	lady's-thumb	Russian thistle (less than 5 cm.)	wild buckwheat
cow cockle		shepherd's-purse	wild oats

Rate

Horizon WO: 93 mL per acre + Target: 500 mL per acre Score adjuvant: 800mL per 100 L of spray solution.

Tank Mixes

None.

Application Information

With: Ground equipment. Do not apply by aircraft. Water volume: 40 L/ac.

Application Tips

For optimum results, apply Horizon to actively growing weeds. An early application will maximize crop yields by reducing weed competition. Application of the spray mixture at a 45° angle in the direction of travel will result in improved spray coverage. Do not use flood type nozzles, controlled droplet application equipment, spray foils or hollow cone nozzles. Weeds emerging after application will not be controlled. Do not apply to crop stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

How it Works

Horizon is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Thorough coverage of the plants is essential for consistent control. Actively growing wild oats and green foxtail stop growing within 48 hours after treatment. Target is a combination of 3 systemic hormonal herbicides that accumulate in the growing point of susceptible plants, producing abnormal growth and disrupting the transport system in plants.

Expected Results

Grassy weeds: Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within 1 - 3 weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and complete control 3 - 5 weeks after application. Broadleaf weeds: Control can take up to 7 - 14 days depending on weather and growing conditions. Leaves curl, leaf edges turn brown, petioles twist, plant ceases growth and turns brown and dies.

Restrictions

Rainfall: Rainfall within 30 minutes of application may reduce the effectiveness of Horizon WO. Target: rainfall within 3 hours will reduce activity.

Grazing: Do not graze or harvest for livestock feed within 7 days of application. Most vegetables and fruit crops are very sensitive to drift.

Re-cropping: Do not treat wheat underseeded to forages. Cereal and broadleaf crops can be grown the year following application.

Environmental Precautions

Both Horizon and Target are toxic to aquatic organisms. Observe buffer zones specified on Horizon and Target labels.

Leaching: Leaching is possible, particularly in areas where soils and/or the depth to the water table is shallow.

Cypress (cont'd)**Toxicity**

Horizon Acute oral LD₅₀ (rats) = 2,276 mg/kg. Target: Acute oral LD₅₀ (rats) = MCPA 100 - 500 mg/kg; Mecoprop = 930 mg/kg; Dicamba = 2,629 mg/kg.

Storage

Heated storage only. Store product in a well ventilated room.

Deploy/Nimble

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Deploy (PCP #29149)	Arysta LifeScience	Thifensulfuron methyl: 50% + tribenuron methyl 25%	Dry flowable	480 grams
Nimble (PCP # 29467)	Cheminova		Water dispersable granules	320 grams

Crop and Staging

Apply when the cereals are in the two-leaf to flag leaf (shot blade) stage of growth (prior to head emergence). For seedling or established grasses, apply when weeds are young and actively growing; no growth stage mentioned for grasses.

Cereals	Seedling or established grasses for forages or seed production
Barley Oats Wheat (spring, winter and durum)	Meadow brome, smooth brome, creeping red fescue, tall fescue, orchard grass, crested wheatgrass, intermediate wheatgrass, pubescent wheatgrass, tall wheatgrass, slender wheatgrass, streambank wheatgrass, northern wheatgrass, western wheatgrass. Established grasses for forage or seed production: Kentucky bluegrass.

Weeds and Staging

Apply to emerged, young, actively growing weeds that are less than 10 cm tall or across.

Weeds controlled	Weeds suppressed
ball mustard chickweed common groundsel, corn spurry cow cockle flixweed green smartweed hemp-nettle kochia lady's-thumb lamb's-quarters narrow-leaved hawk's-beard	redroot pigweed Russian thistle shepherd's-purse stinkweed tartary buckwheat volunteer canola (excluding CLEARFIELD) volunteer sunflower wild buckwheat (cotyledon - 3 leaf) wild mustard Canada thistle (< 15 cm tall) cleavers (1 - 3 whorl) round-leaved mallow (2 - 6 leaf) scentless chamomile sow-thistle (< 15 cm tall) stork's-bill (2 - 6 leaf) toadflax (< 15 cm tall)

Rate

Deploy 75 or Nimble 75 DF: 8 g/acre plus non-ionic surfactant (Agral 90, Agsurf, or Citowett Plus) at 0.2% v/v or 0.2 L per 100 L of spray solution.

Caution: Apply within 24 hrs of mixing.

Tank Mixes

Not all mixes are registered for both products.

Tank-mix partner	Deploy or Nimble + tank mix partner rate	Additional weeds controlled
Spring, winter and durum wheat, barley		
2,4-D Ester or amine	Deploy or Nimble @ 8 g/acre + non-ionic surfactant + 2,4-D 500 @ 340 - 445 mL/acre	Burdock (seedlings), cocklebur, false ragweed, giant ragweed, hare's-ear mustard, Indian mustard, prickly lettuce, Russian ragweed, tumble mustard, volunteer CLEARFIELD canola.
Spring, winter and durum wheat, barley and oats		
MCPA	Deploy or Nimble @ 8 g/acre + non-ionic surfactant + MCPA 500 @ 283 - 445 mL/acre	
Spring wheat, including durum, barley		
Assert	Deploy or Nimble @ 8 g/acre + non-ionic surfactant + Assert @ 525 - 646 mL/acre	Broadleaf weeds controlled by Deploy or Nimble plus wild oats at 1 - 3 leaf.
Assert + MCPA ester	Deploy or Nimble @ 8 g/acre + non-ionic surfactant + Assert @ 525 - 646 mL/acre + MCPA ester @ 340 - 445 mL/acre	Broadleaf weeds controlled by Deploy or Nimble + MCPA plus wild oats at 1 - 3 leaf.
Axial	Nimble @ 8 g/acre + Axial @ 162 - 243 mL/acre + Adigor @ 283 mL/acre	Low rate: Persian dandel; high rate: wild oats, volunteer oats, green foxtail, yellow foxtail, volunteer canaryseed, and proso millet.
Horizon + Score	Deploy or Nimble @ 8 g/acre + Horizon @ 93 mL/acre. + Score @ 0.8% V/V.	Broadleaf weeds controlled by Deploy or Nimble plus wild oats, green foxtail. Apply at 2 leaf to flag leaf of the crop.
Horizon + MCPA + Score	Deploy or Nimble @ 8 g/acre + Horizon @ 93 mL/acre. + MCPA @ 340 - 445 mL/acre + Score @ 0.8% V/V.	Broadleaf weeds controlled by Deploy or Nimble + MCPA plus wild oats, green foxtail. Apply at 3 leaf to flag leaf of the crop.
Puma ¹²⁰ Super	Deploy or Nimble @ 8 g/acre + Puma ¹²⁰ Super @ 155 - 311 mL/acre. Do not add surfactant	Broadleaf weeds controlled by Deploy or Nimble plus wild oats, green foxtail, yellow foxtail and barnyard grass.
Puma ¹²⁰ Super + MCPA	Deploy or Nimble @ 8 g/acre + Puma ¹²⁰ Super @ 155 - 311 mL/acre. + MCPA @ 226 - 340 mL/acre. Do not add surfactant	Broadleaf weeds controlled by Deploy or Nimble + MCPA plus wild oats, green foxtail, yellow foxtail and barnyard grass.
Spring wheat (excluding durum) and barley		
Attain + Adjuvant	Deploy or Nimble @ 8 g/acre + Attain A @ 121 mL/acre + Attain B @ 202 mL/acre + Agral 90 or AgSurf @ 2L/1000 L of spray solution	Weeds controlled by Deploy or Nimble plus Group 2 resistant cleavers. Apply at 4 leaf to flag leaf stage of spring wheat or barley.
Banvel	Deploy or Nimble @ 8 gm/acre + Banvell @ 44.5 mL/acre + adjuvant @ 0.2%v/v	Group 2 resistant kochia.
Curtail M + Surfactant	Deploy or Nimble @ 8 g/acre + Curtail M @ 0.61 L/acre + Surfactant @ 2 L/1000 L of spray solution	Weeds controlled by Deploy or Nimble plus Canada thistle and wild buckwheat. Apply at 3 leaf to flag leaf stage of wheat and barley.
Lontrel 360 + Surfactant	Deploy or Nimble @ 8 g/acre + Lontrel 360 @ 84 mL/acre + Surfactant @ 2 L/1000 L of spray solution	
Lontrel 360 + 2,4-D + Surfactant	Deploy or Nimble @ 8 g/acre + Lontrel 360 @ 84 mL + 2,4-D @ 283 L/acre + Surfactant @ 2 L/1000 L of spray solution	Weed controlled by Deploy or Nimble plus Canada thistle, lady's thumb, perennial sow thistle, stinkweed, volunteer canola, wild buckwheat, wild mustard and suppression of cleavers.
Lontrel 360 + MCPA + Surfactant	Deploy or Nimble @ 8 g/acre + Lontrel 360 @ 84 mL/acre + MCPA @ 340 mL/acre + Surfactant @ 2 L/1000 L of spray solution	

Deploy/Nimble (cont'd)

Tank-mix partner	Deploy or Nimble + tank mix partner rate	Additional weeds controlled
Spring wheat (excluding durum) and barley		
Lontrel 360 + Banvel	Deploy or Nimble @ 8 g/acre + Banvel II @ 44 mL/acre + Agral 90 or AgSurf @ 2 L/1000 L of spray solution	Weed controlled by Deploy or Nimble plus Group 2 resistant kochia. Apply at 2 - 5 leaf stage of crop.
Lontrel 360 + Banvel + Horizon	Deploy or Nimble @ 8 g/acre + Banvel II @ 44 mL/acre + Horizon @ 93 mL/acre + Score @ 323 mL/acre	Weed controlled by Deploy or Nimble plus Group 2 resistant kochia, wild oats and green foxtail. Apply at 2 - 5 leaf stage of crop.
Spring wheat only (excluding durum) not underseeded to legumes		
Everest + 2,4-D + Adjuvant	Deploy or Nimble @ 8 g/acre + Everest @ 7 g/acre + 2,4-D @ 226 mL/acre + Agral 90 @ 0.25 %V/V	Wild oats (high infestations), green foxtail, and tame oats.
	Deploy or Nimble @ 8 g/acre + Everest @ 11 g/acre + 2,4-D @ 226 mL/acre + Agral 90 @ 0.25 %V/V	Wild oats (low infestations), green foxtail, and tame oats.
Horizon 240 + Score	Deploy or Nimble @ 8 g/acre + Horizon @ 93 mL/acre. + Score @ 0.8% V/V.	Broadleaf weeds controlled by Deploy or Nimble plus wild oats, green foxtail. Apply at 2 - flag leaf of the crop.
Horizon 240 + Banvel II + Surfactant	Deploy or Nimble @ 8 g/acre + Horizon 240 @ 93 mL/acre + Banvel II @ 44 mL/acre + Score @ 323 mL/acre	Broadleaf weeds controlled by Deploy or Nimble plus kochia (including Group 2 resistant kochia), green foxtail and wild oats.
Horizon 240 + MCPA + Score	Deploy or Nimble @ 8 g/acre + Horizon @ 93 mL/acre. + MCPA @ 340 - 445 mL/acre + Score @ 0.8% v/v.	Broadleaf weeds controlled by Deploy or Nimble + MCPA plus wild oats, green foxtail. Apply at 3 leaf to flag leaf of the crop.

Application Information

How to Apply: Apply with ground sprayers. Do not apply by air.

Water volume: 22 L/acre minimum.

How it Works

Absorbed through foliage. Inhibits cell development.

Expected Results

Weed growth stops immediately. Discolouration of dying weeds may not be noticeable for 1 - 3 weeks after application depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under stress. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed, and re-growth may occur.

Restrictions

Rainfall: Rainfall within 4 hours of application may lessen degree of weed control.

Grazing: Barley, oats and wheat may be grazed or fed to livestock 7 days after application.

Re-cropping: Do not plant to any crop until 2 months after application.

Maximum Allowable Application: Do not exceed a total of 8 g/acre of Deploy or Nimble per crop year.

Environmental Precautions

Both Deploy and Nimble are toxic to non-target terrestrial plants and aquatic organisms. Leave a 15 m buffer zone between sprayed area and sensitive habitats.

Runoff: Avoid contamination by runoff by using the recommended buffer zones.

Toxicity

Ingestion: Low toxicity. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. **Dermal:** Low toxicity. **Inhalation:** Low toxicity.

Storage

Store in a cool, dry place.

Dual Magnum

Group 15

Herbicides

Formulations

Product	Company	Active ingredient	Formulations	Container size
Dual II Magnum (PCP # 25728)	Syngenta	Metolachlor: 915 g/L	Solution	12 L jug

Crop and Staging

Pre-plant incorporated or irrigated within 10 days if applied pre-emergent

Field crops			
corn (field, sweet, silage)	dry common beans	lima beans	pinto beans
peas (grown for processing)	potatoes	soybean	sugar beet
sweet white lupins			
Shelterbelts consisting of			
black spruce (2nd year or older)	jack pine	Norway spruce (2nd year or older)	poplar ((2nd year or older)
red pine	white pine	white spruce (2nd year or older)	
Fruits			
fruit trees (bearing and non-bearing)	newly planted strawberries		

Weeds Controlled, Staging and Rate

Pre-emergent or pre-plant incorporated

Apply at 0.7 L/ac.

American nightshade	eastern black nightshade	old witch grass	yellow nutsedge (preplant incorporation only)
barnyard grass	fall panicum	redroot pigweed (suppression)	
crabgrass (hairy and smooth)	green foxtail	yellow foxtail	

Tank Mixes

Apply pre-plant incorporated or pre-emergence with irrigation.

Tank-mix partner	Tank mixture rate
Aatrex - 480(Corn only)	Dual II Magnum @ 0.5 - 0.7 L/acre + Aatrex 480 @ 0.85 - 1.25 L/acre + non-ionic surfactant @ .1% v/v

Application Information

How to Apply: Apply with ground equipment: band or overall spray.

Water volume: 28 - 56 L/ac.

Incorporation: Incorporate to 5 cm. Do not exceed this depth since product dilution can occur. If using tandem discs, set to cut to a depth of 10 cm operated at 6 - 9 km/h. If using vibrating shank cultivators with overlapping sweeps, set 10 cm deep and operate at 10 - 13 km/h. Spike tooth or diamond tooth harrows are good incorporation equipment. Immediate incorporation is not necessary although desirable.

Application Tips

For band treatments, use a press wheel ahead of the nozzle to level the band.

How it Works

Inhibits germination, particularly grasses.

Dual Magnum (cont'd)**Expected Results**

Annual grasses do not germinate or under dry conditions, may die back soon after emergence.

Restrictions

Rainfall: Moisture required to move chemical to area of germination but an excess may move it below this area.

Grazing: Do not graze treated immature crops or cut for hay. Sufficient data are not available to support such use. In the case of corn, immature means before ear emergence.

Preharvest Interval: Do not harvest corn within 80 days, asparagus 16 days, sweet corn 50 days of making a post-emergent application. Make only one application per season.

Recropping: Winter cereals may be seeded 4.5 months after treatment.

Environmental Precaution

Dual II Magnum is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Leave a buffer zone of 29 m between the sprayed area and the edge of any sensitive habitats.

Runoff: Reduce the possibility of runoff from treated areas through the use of recommended buffer zones.

Toxicity

Ingestion: Slightly toxic. Acute oral LD₅₀ (rat) = 2,149 mg/kg. Dermal: Slightly toxic.

Storage

Heated storage required.



Caution Poison

DyVel

Group 4

Formulations

Product	Company	Active ingredient	Formulations	Container size
DyVel (PCP # 16545)	BASF Canada	Dicamba: 84 g/L + MCPA K-salt: 336 g/L	Solution	2 x 10 L jug

Crop and Staging

Crop	Staging
Spring wheat Durum wheat Barley Oats	2 - 5 leaf stage
Winter wheat	In spring when winter wheat is 15 - 25 cm tall, before shot blade stage

Weeds and Staging

ball mustard	cow cockle**	Indian mustard	Russian pigweed	volunteer sunflowers
burdock	false ragweed	kochia	Russian thistle	wild buckwheat
Canada thistle ***	flixweed	lady's-thumb	shepherd's-purse	wild mustard
cleavers	giant ragweed	lamb's-quarters	stinkweed	wild radish
cocklebur	green smartweed	perennial sow-thistle ***	tartary buckwheat	
common ragweed	hare's-ear mustard	prostrate pigweed	tumble mustard	
corn spurry **	hemp-nettle (6.5)**	redroot pigweed	volunteer canola ****	

* Suppression.

** For best results apply when weed is at 2-to 3-leaf stage.

*** Top growth control. Weeds may not be controlled if application is made at a more advanced stage of crops and weeds.

**** Best results will be obtained if application is at the 2 to 4 leaf stage.

Rate

500 mL/acre.

Tank Mixes

Tank-mix partner	DyVel + tank mix partner rate	Additional weeds controlled
In spring wheat (including durum) only		
Everest + Adjuvant	DyVel @ 505 mL/acre + Everest @ 17.4 g/acre + Agral 90 or AgSurf @ 0.25 % V/V	Weeds controlled or suppressed by DyVel plus wild oats and green foxtail. Apply at 1 - 6 leaf stage of the crop
Horizon + NG/NextStep Ng or Foothills/Signal/Ladder/Legend + Adjuvant	DyVel @ 505 mL/acre + Horizon NG/NextStep NG @ 376 mL/acre or Foothills/Signal/Ladder/Legend @ 93 mL/acre + adjuvant @ 0.8 % V/V	Weeds controlled or suppressed by DyVel plus wild oats. Apply at 2 - 5 leaf stage of the crop
	DyVel @ 505 mL/acre + Horizon NG/NextStep NG @ 473 mL/acre + or Foothills/Signal/Ladder/Legend @ 117 mL/acre + adjuvant @ 1.0 % V/V	Weeds controlled or suppressed by DyVel plus wild oats, green foxtail and yellow foxtail. Apply at 2 - 5 leaf stage of the crop

Application Information**How to Apply:** Apply with ground sprayers or by air.**Water volume:** Ground: 40 L/acre. Air: 8 L/acre minimum.**Application Tips**

Best under good growing conditions and air temperature 10 - 25°C. Avoid application when crop is under stress from disease or adverse environmental conditions. Avoid application if frost or severe drop in night temperature is forecast. Crop damage can occur if the chemical is applied at any time other than the recommended crop stage. Shortening of straw may occur without loss in yield.

How it Works

DyVel is a systemic herbicide absorbed through the roots and leaves and translocated readily.

Expected Results

Weeds: Twisting, bending of main stem and leaf petioles, cupping of leaves or increase in root size occur within 10 - 14 days. Poor results may be expected if older weeds are sprayed or if less than recommended water volume is used.

Restrictions

Rainfall: Do not spray if rain is expected within 4 hours of application.

Grazing Restrictions: Do not harvest forage or cut hay within 30 days after application. Do not permit lactating dairy animals to graze fields within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter

Preharvest Intervals: 60 days.

Re-cropping: No restrictions the year after treatment.

Environmental Precautions

DyVel is toxic to aquatic organisms and non-target terrestrial plants. Leave a 15 m buffer zone between last spray swath and sensitive wildlife habitats such as shelterbelts, wetlands, sloughs, and woodlots.

Surface Runoff: Avoid applying this product when heavy rain is forecast.

Leaching: This product can leach where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = dicamba 2,629 mg/kg, MCPA = 700 mg/kg. Non-toxic to birds, fish and bees. May cause burns and can be absorbed through the skin.

Storage

Protect from freezing, but if frozen, no activity is lost if completely resuspended.

DyVel Dsp



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulations	Container size
DyVel DSP (PCP # 27856)	BASF Canada	Dicamba: 110 g/L + 2,4-D: 295 g/L + Mecoprop-P: 80 g/L	Solution	2 x 10 L jug 110 L shuttle

Crop, Stage and Rate

Crop	Stage	Rate per acre
Spring wheat (including durum)	3 - 5 leaf	0.34 - 0.45 L
Winter wheat	Before crop is 30 cm tall in the spring (top leaf extended)	0.34 - 0.45 L
Barley	2 - 3 true leaf	0.34 L
Corn	Before crop is 15 cm tall (top leaf extended)	0.34 - 0.45 L
Stubble fields and summerfallow	Stage according to weed	0.45 - 0.71 L
Pasture lands*	Do not apply on freshly seeded pastures until established.	1.31 L
Roadside	Stage according to weed	1.31 L

* Do not apply to a pastureland where legumes are present. Most legumes may be damaged

Weeds and Staging

For best results, apply when weeds are actively growing and are in 2 - 3 leaf stage, unless otherwise noted.

Easy to kill - Use the low registered rate for each crop to control the following weeds			
annual smartweeds	knotweed	Russian thistle	wormseed mustard
ball mustard	kochia	sow thistle	volunteer canola (2 - 4 leaf stage, prior to bolting)
cocklebur	lady's-thumb	stinkweed	
common ragweed	lamb's-quarters	tall mustard	
corn spurry	prostrate pigweeds	wild buckwheat	
hedge bindweed	redroot pigweed	wild mustard	
Hard to kill - Use the high registered rate for each crop to control the following weeds or to be used when there are heavy weed populations or adverse weather conditions			
Canada thistle (top growth control only)*	cleavers (suppression) (1 - 2 whorl)	Jerusalem artichoke	tartary buckwheat
	field bindweed (best when actively flowering)	round-leaved mallow (suppression)	
cow cockle	flixweed	shepherd's-purse	
Pasture and along roadsides – Spring: Apply when weeds are in 2 - 5 leaf stage and actively growing			
alders	bull thistle	poison ivy	sheep laurel
chicory	goat's-beard	ragwort	white cockle

DO not apply to pastures with legumes, they will be killed or damaged.

Tank Mixes

Tank-mix partner	DyVel + tank mix partner rate	Additional weeds controlled
In spring wheat (including durum)		
Everest + Adjuvant	DyVel DSP @ 343 mL/acre + Everest 17 g/acre + Agral 90 or AgSurf @ 0.25% v/v	Weeds controlled or suppressed by DyVel DSP plus wild oats and green foxtail.
In corn		
Aatrex 480	DyVel DSP @ 343 - 445 mL/acre + Aatrex 480 @ 910 mL/acre	Apply when corn is 5 to 10 cm in height and before the broadleaf weed reaches 10 cm in height and the annual grasses exceed the two leaf stage.

Application Information

How to Apply: With: Ground equipment. Do not apply by air.

Water volume: 40 L/ac for cereals; 81 - 142 L/ac for corn.

Application Tips

Ensure that proper rate, water volume and timing is used; otherwise, crop injury may occur. Risk of crop injury increases as water volume drops below 36 L/acre. Do not apply when temperatures exceed 27°C and relative humidity is very high. Apply to weeds that are actively growing and are in the 2 - 3 leaf stage for best results.

How it Works

Accumulates in the growing points resulting in abnormal growth, which disrupts the transport system in plants.

Expected Results

Weeds: Visible effects occur 7 - 14 days after spraying. Leaves curl, leaf petioles twist, leaf edges turn brown, the whole plant ceases growth, eventually turns brown and dies.

Crop: Improper applications can result in abnormal bending at the internodes of grain stalks, difficulty in head emergence from sheath, curled awns, malformed kernels and sterile florets. Poor results may be expected with overmature weeds, inadequate coverage or rainfall less than 4 hours after application.

Restrictions

Rainfall: Do not spray if rain is expected within 4 hours.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Preharvest Intervals - stubble land, roadsides, pasturelands and summerfallow: Do not harvest forage or cut for hay within 30 days after application.

Environmental Precautions

This product is toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. Observe buffer zones specified under Directions for Use on the label.

Drift: Garden crops and ornamental plants are very sensitive to drift.

Runoff: Avoid water contamination through runoff or leaching by observing recommended buffer zones and avoid application on coarse textured soils or areas with a high water table.

Toxicity

Ingestion: Slightly toxic. Acute oral LD₅₀ (rat) = 1,000 mg/kg. **Dermal:** Slightly toxic. Non-toxic to fish and bees.

Storage

Heated storage preferred. If frozen, shake thoroughly before use.

Eclipse III



Caution Irritant



Caution Poison

Group 4, 9

Formulations

Product	Company	Active ingredient	Formulations	Container size
Eclipse III A (PCP # 29032)	Dow AgroSciences Canada	Clopyralid: 360 g/L	Solution	4.45 L
Eclipse III B (PCP # 29033)	Dow AgroSciences Canada	Glyphosate: 480 g/L		2 X 7.5 L

Crop, Stage and Rate

Crop	Stage	Rate per acre
Glyphosate tolerant canola varieties* (i.e. Roundup Ready canola)	2 - 6 leaf stage	Eclipse III A: 113 mL Eclipse III B: 380 mL

*Some short-term, visual yellowing may occur when Eclipse III tank mix is applied at the late application 4 to 6 leaf stage of the crop. This effect is temporary and will not influence crop growth, maturity or yield.

One case will treat 40 acres.

Weeds Controlled

Annual grasses	Annual broad-leaved weeds	Perennial weeds
green foxtail volunteer barley volunteer wheat wild oats	chickweed cleavers corn spurry cow cockle hemp nettle kochia lady's-thumb lamb's-quarter night-flowering catchfly redroot pigweed	Russian thistle shepherd's-purse smartweed stinkweed volunteer canola (non-glyphosate tolerant) wild buckwheat wild mustard wild tomato
		Canada thistle, quackgrass, perennial sow-thistle (season-long top growth control) dandelion < 15 cm diameter (top growth) dandelion > 15 cm diameter (suppression)

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air. Note: Do not use galvanized steel or unlined steel tanks as a combustible gas may be formed.

Water volume: 40 L/ac.

Application Tips

Ensure that the crop has not advanced beyond the recommended leaf stage for application. Treat crops during warm weather when weeds are actively growing. Best results are obtained when Canada thistle is actively growing and soil moisture is adequate for rapid growth. Do not treat weeds under poor growing conditions. Reduced results may occur when treating weeds heavily covered with dust. Reduced results may occur if water-containing soil is used, such as water from ponds and unlined ditches.

How it Works

Eclipse tank mix is readily absorbed by foliage and roots. Eclipse A is a systemic, hormone-type herbicide absorbed by leaf, stem surfaces and roots and translocated upwards and downward. Eclipse B is a non-selective, systemic herbicide that moves from the foliage into the roots and kills the entire plant. Maximum efficacy results from foliar application to young, actively growing plants.

Expected Results

Under good growing conditions, wilting and yellowing of annuals occurs within 2 - 4 days. Herbicide symptoms on

affected annual and perennial weeds may also include swollen growing points and roots, cupping of leaves, twisted and distorted stems and leaves. Cool or cloudy weather may slow activity. Affected weeds turn yellow before turning brown as they die. Death of weeds may not occur until 14 - 21 days after application. Browning of above ground growth and deterioration of roots occurs.

Restrictions

Rainfall: Do not apply if rainfall is forecast for the time of application.

Grazing: Allow 3 to 5 days before grazing treated areas.

Re-cropping: Fields previously treated with Eclipse III tank mix can be seeded the following year to wheat, oats, barley, rye (not underseeded with legumes, clover or alfalfa), forage grasses, flax, canola, mustard, field peas, or they can be summerfallowed. Seed only those crops listed above in the year following treatment. Do not seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application, delay seeding field peas an additional 12 months (total 22 months following application).

Manure and Straw: Residues of the herbicide tank mix occurring in the straw may be harmful to susceptible plants. Do not use straw or crop residue from treated crops for composting or mulching susceptible broadleaved crops. If the straw or crop residue is used for animal bedding or feed, return the manure to fields to be planted to clopyralid tolerant crops such as wheat, barley, oats, rye, forage grasses, canola or flax. Do not grow susceptible crops such as peas, beans, lentils, potatoes, sunflowers or other sensitive crops on land which has been mulched with straw containing clopyralid residues within the last 12 months. such as peas, lentils, potatoes, and sunflower.

Environmental Precautions

Avoid contamination of non-target land, water or irrigation ditches. Do not use Eclipse III tank mix where it can enter water bodies.

Toxicity

Eclipse A: Ingestion: Non-toxic. Acute oral LD₅₀ (rat) = > 5,000 mg/kg.

Eclipse B: Non-toxic. Acute oral LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Store in heated storage. If products are frozen, bring to room temperature and agitate before use.

Edge Granular

Group 3

Formulations

Product	Company	Active ingredient	Formulations	Container size
Edge (PCP # 20980)	Dow AgroSciences Canada	Ethalfuralin: 5%	Granules	25 kg, 544 kg

Crop and Timing

Fall pre-plant incorporated: Apply between September 1 and soil freeze-up

Spring: Cultivate to destroy weeds, Apply prior to seeding and incorporate.

canola	dry beans (white or	lentils (fall application	peas	sunflower
caraway	kidney only)	only)	safflower	
coriander	faba beans	mustard (yellow only)	soybeans	

Edge Granular (cont'd)**Weeds Controlled**

Annual grasses			
barnyard grass	green foxtail	volunteer barley*	wild oats*
crabgrass	fall panicum	volunteer wheat*	yellow foxtail

Broadleaved weeds				
chickweed	cow cockle	lady's-thumb*	prostrate pigweed	Russian thistle*
cleavers*	hemp-nettle*	lamb's-quarters	purslane	wild buckwheat
corn spurry	kochia	nightshade*	redroot pigweed	

* Suppression

Rate

Organic Matter	Spring: sand to sandy loam (kg/acre)	Spring: loams to clay (kg/acre)	Spring: loams to clay (kg/acre)	Fall: loams to clays (kg/acre)
2 - 4% (dk brown soils)	6.9	6.9	8.9	8.9
4 - 6% (black soils)	6.9	8.9	8.9	11.3
6 - 15% (deep black soils)	8.9	8.9-11.3*	11.3	11.3

* For improved results on medium-heavy texture soils with 6 to 15% organic matter, use the higher rate in fields with high populations of weeds.

Application Information

Incorporation: First incorporation must be done within 24 hours of application. Second incorporation should be done at right angles to the first.

Spring application: Apply Edge 5G when the soil is in good working condition. Ensure that the early season flush of weeds are killed by either first or second incorporation. Delay second incorporation a minimum of 3 days. This allows time for greater release of Edge from the granule into the soil and assures a more uniform distribution.

Fall application: It is recommended that both incorporations be completed in the fall. For optimum weed control, prework the field early in the spring to promote germination of weeds and to allow green growth of resistant weeds to develop. Use a 5 - 8 cm deep cultivation with vibrashank type cultivator or disc prior to seeding to destroy existing green growth.

Implements: A tandem disc, discer, or field (vibrashank) cultivator is recommended. Set to work 8 - 10 cm deep. Operate disc implements at 7 - 10 km/hr; cultivators at 10 - 13 km/hr. Do not use a field cultivator to incorporate when soil is crusted, lumpy or too wet for good mixing. A tandem disc gives best mixing action on stubble.

Application Tips

To avoid concentrating wild oat and volunteer cereal seeds below the treated layer, do not plow the land prior to Edge application. Do not apply to fields spread with manure during the past 12 months. Do not apply to soils subject to prolonged periods of flooding or soils in poor working condition. Edge 5G can be used where trash is heavier or on standing weeds provided they do not interfere with distribution of the granules and do not limit incorporation. Do not apply on soils with less than 2% organic matter. Application on eroded knolls or Grey Wooded soils with highly variable texture and organic matter may result in a reduced crop stand, delayed development or reduced yield in either treated crop or rotational crop.

How it Works

A pre-emergence herbicide that kills seedlings as they germinate. Inhibits cell division in the actively growing points of the root and shoot. Does not control established weeds.

Expected Results

Weeds: Most die before emerging. Weeds will exhibit swelling of the coleoptile region, stubby, thick primary root development and lack of secondary roots. Plants die from lack of ability to obtain moisture.

Restrictions

Grazing: Do not graze the treated crops or cut for hay. There are not sufficient data available to support such use.

Re-cropping: Do not grow oats, sugar beets and small-seeded grasses such as timothy, canaryseed grass and creeping red fescue in rotation following a crop treated with Edge herbicide. Do not seed wheat as a rotational crop on land if trifluralin and/or ethalfluralin have been used at an oilseed/special crop/barley rate for two consecutive crops. Do not direct seed (zero till) a rotational crop into standing stubble on land that has been treated with trifluralin or ethalfluralin for the previous crop. Cultivation prior to seeding of the rotational crop is strongly recommended to help aerate the soil and promote seedbed conditions, which will enhance seed germination.

Caution: The persistence of Edge herbicide is influenced by soil moisture and the majority of breakdown occurs during the growing season. If drought or extended dry periods were present in the previous year, higher levels of Edge herbicide may be present in the soil. To reduce the possibility of injury to rotational crops, seed shallow into a warm, moist seedbed using recommended agronomic practices and seeding depths. As an additional safety precaution, seeding rate may be increased slightly (10%).

Environmental Precautions

Direct contamination of any body of water with this product may kill fish. Do not contaminate any body of water by direct application, cleaning of equipment or disposal of wastes.

Toxicity

Ingestion: Non-toxic. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. **Dermal:** slightly toxic.

Storage

Store in areas not exposed to high temperatures or prolonged, direct sunlight. Also, do not let product remain standing in applicators under these conditions. After filling the granular applicator, close the lid immediately to avoid prolonged exposure to direct sunlight.



Warning Poison

Embutox/Caliber/Cobutox

Group 4

Formulations

Product	Company	Active ingredient	Formulations	Container size
Caliber 625 (PCP # 27910)	United Agri Products	2,4-D B: 625g/L	Emulsifiable concentrate	10 L jug
Cobutox 625 (PCP # 27911)	Interprovincial Cooperatives			
Embutox 625 (PCP # 27912)	Nufarm Agriculture			

Crop, Rate and Stage

Crop	Stage	Rate per acre
Cereals		
Wheat (including durum), barley, oats	After the crop has five fully expanded leaves but before the early flag leaf (shot-blade or boot) stage.	0.71 - 0.91 L
Corn, field	After the crop is 40 cm high but before the beginning of tasseling. Use drop nozzles.	0.71 - 1.1 L
Forages		
Seedling alfalfa, bird's-foot trefoil	From the first to the fourth trifoliate leaf stage	0.71 - 0.91 L
Seedling clovers (alsike ^{***} , red ^{***} , Dutch) but not sweet clover	As soon as possible after the first trifoliate leaf stage.	0.71 - 0.91 L
Pasture containing forage legumes	After cutting or grazing preferably when regrowth is not above 7.5 cm high.	0.71 - 1.1 L
Seedling grasses ^{**} for forage	2-4-leaf stage of seedling grasses.	0.71 - 0.91 L

Embutox/Caliber/Cobutox (cont'd)

Weeds controlled at 0.71 L/acre (1 - 2 leaf stage)	Weeds controlled at 0.91 L/acre (1 - 2 leaf stage)
ball mustard lamb's-quarters ragweed, redroot pigweed shepherd's purse stinkweed wild mustard (up to 4 leaf stage) wormseed mustard	bull thistle (rosette stage) Canada thistle (15cm to early bud) ¹ chicory (rosette stage) curled dock (early growth stage) dandelions (prior to bud stage) ¹ field bindweed (late summer) ¹ green smartweed (at 1.1 L rate) horsetail (10 - 15 cm high) ¹ lady's-thumb (at 1.1 L rate) narrow-leaved hawk's beard (fall rosette stage, after alfalfa has gone dormant) oak-leaved goosefoot perennial sow-thistle (rosette stage) ¹ wild buckwheat wild radish yellow rocket (late september to mid october)

* Oats may be damaged if treated before the recommended growth stage. ** Smooth brome grass, creeping red fescue, meadow fescue, tall fescue, orchard grass, timothy, crested wheatgrass, intermediate wheatgrass, streambank wheatgrass, tall wheatgrass. *** Red and Alsike clover may be damaged by 2, 4-D B application.

¹ Suppression

Tank Mixes

Tank-mix partner	2,4-D B + tank mix partner rate	Additional weeds controlled
In seedling alfalfa and bird's-foot trefoil		
MCPA amine	2,4-D B @ 0.51 L/acre Plus MCPA amine 500 @ 28 mL/acre or 23.6 mL/acre of MCPA amine 600	Improve control of wild mustard and narrow-leaved hawk's beard in alfalfa and bird's-foot trefoil.

Application Information

How to Apply: Ground equipment. Do not apply by air. Water volume: 60 - 80 L/ac.

Application Tips

Do not exceed recommended rate and apply at appropriate growth stage for each crop. Apply product in warm weather. Do not apply under drought conditions. Application must be made before the crop shields the weeds.

How it Works

Susceptible plants convert 2,4-DB to 2,4-D. Certain legumes do not convert it. 2,4-DB is translocated to actively growing parts.

Expected Results

Weeds should die within 2 - 3 weeks of treatment. Smartweeds seedlings only stunted.

Restrictions

Rainfall: Rainfall before the foliage has dried from the spraying may decrease activity.

Grazing: Do not use treated crops for grazing of livestock or green feed until 30 days after application

Environmental Precautions

2,4-D B formulations contain a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Do not contaminate ponds, streams, rivers and other water sources.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 1,603 mg/kg. Toxic to fish. Non-toxic to birds and bees.

Storage

Heated storage is not required. If frozen, warm to 20 - 22°C and agitate thoroughly.



Caution Poison

Eptam 8-E

Group 8

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Eptam 8-E (PCP# 11284)	Gowan Canada	EPTC: 800 g/L	Emulsifiable concentrate	2 x 10 L

Crop, Staging and Rates

Crop	Rate/acre	Specific comments
Alfalfa, bird's-foot trefoil (new seedlings)	1.7 L	Apply prior to planting and incorporate. Do not use if seeding a grain or grass nurse crop.
Cicer milkvetch, sweet clover (for seed production)	1.7 L	
Dry common beans (snap, red kidney beans)	1.7 - 2.2 L	Apply prior to planting and incorporate. Do not use on cow, Adzuki, soy or lima beans.
Flax, excluding low linolenic acid varieties*	Fall: 1.7 - 2.2 L Spring: 1.4 - 1.7 L	Fall pre-plant incorporated. Apply before soil freeze-up. Spring pre-plant incorporated. Do use on soils with < 3% OM. Seed shallow, less than 3 cm, into a firm seedbed.
Potatoes	Fall: 2.2 - 3.4 L Spring: 1.7 - 3.4 L	Fall or spring pre-plant incorporated. Can also be metered in to sprinkler irrigation equipments. See label for details.
Sunflower	Fall: 1.7 - 2.2 L Spring: 1.7	Fall and spring pre-plant incorporated. Do use on soils with < 3% OM.
Sugarbeet: - fall pre-plant incorporated	2.2 L	Fall treatment: in the late fall before the ground freezes.
Sugarbeet - sprinkler irrigation water	1.1 - 1.7 L	

Weeds and Staging

Must be applied prior to emergence of the weeds. Emerged weeds will not be controlled

annual bluegrass
barnyard grass*
common chickweed
corn spurry
green foxtail*

hairy nightshade
henbit
italian ryegrass
lamb's-quarters*
prostrate pigweed*

purslane
quackgrass
redroot pigweed*
tumble pigweed*
volunteer barley

volunteer oats
volunteer wheat
wild oats

*In dry beans, improved control can be obtained by tank mixing with Treflan or Rival.

Tank Mixes

Tank-mix partners	Products rate	Specific comments
Common dry beans (snap and red kidney only)		
Rival EC or Treflan EC	Eptam @ 1.2 L + Rival 500 EC @ 0.45 L or Treflan 545 EC @ 0.486 L	Under extreme weather conditions, such as cold temperatures and wet soils or higher temperatures and dry soils, stunting may occur.
Flax (Do not use on low linolenic acid varieties) - spring treatment:		
Rival EC or Treflan EC	Eptam @ 1.2 L + Rival 500 EC @ 0.45 L or Treflan 545 EC @ 0.486 L	May result in reduced crop stand and/or crop damage; however, yield should not be affected.

Eptam 8-E (cont'd)

Tank-mix partners	Products rate	Specific comments
Potatoes		
Sencor	Light soils: Eptam @ 1.7 - 2.2 L + Sencor @ 0.3 L Heavy soils: Eptam @ 1.8 - 2.2 L + Sencor @ 0.3 L	Do not use on sandy or coarse textured soils with less than 2% organic matter as crop injury may result.

Application Information

How to Apply: Apply with ground equipment or irrigation water. Do not apply by air.

Water volume: 45 L/ac minimum.

Incorporation: Incorporate immediately. Second incorporation must be at right angles to the first. Apply evenly and mix with a minimum of the top 7.5 cm of soil thoroughly.

Application Tips

For use on mineral soils only. When applying Eptam 8-E with granular fertilizer, a minimum of 81 kg/ac and a maximum of 324 kg/ac of fertilizer is required. See product label for further instructions.

How it Works

Taken up by the roots and shoots of a germinating weed where it disrupts and stops further shoot growth.

Expected Results

Weeds: Absorbed by the weed shoot; therefore, most affected weeds will not emerge. Numerous chlorotic and bleached shoots may be visible by removing the top few inches of treated soil. Provides effective weed control for approximately 6 - 8 weeks.

Crops: If crop seedlings are weak, some injury may occur.

Restrictions

Rainfall: Soluble in water, may leach under wet conditions.

Grazing: Do not graze or harvest for livestock feed in year of treatment.

Pre-harvest interval: Do not apply within 45 days of harvest.

Re-cropping: No restrictions.

Environmental Precautions

Eptam 8-E is toxic to fish and wild mammals.

Runoff: Do not apply where runoff is likely to occur.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 1,600 mg/kg.

Storage

Heated storage not required.

Equinox EC

Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Equinox EC (PCB # 27603)	BASF Canada	Tepraloxymid: 200 g/L	Emulsifiable concentrate;	3.24 L jug
Merge adjuvant (PCP 24702)			Solution	8.1 L jug

Crop and Stage

Crop	Stage	Rate of Equinox
Canola	emergence to 6 leaf	54 - 84 mL/acre
CLEARFIELD canola		
CLEARFIELD Xceed		
Mustard (brown, oriental, yellow)		
Liberty Link canola	emergence to rosette stage	54 - 101 mL/acre
CLEARFIELD lentils	1 - 6 node stage.	
Chickpea	Emergence to 9 node	
Dry beans	Emergence to 7th trifoliate leaf	
Lentils	Emergence to 9 leaf	
Flax (including low linolenic varieties),	Emergence to 35 cm	
Field peas.	Emergence to 9 leaf	
Sunflower (incl. CLEARFIELD varieties)	Emergence to 10 leaf	54 - 81 mL/acre

Weeds, Staging and Rates

Weeds	Stage	Rate
Annual grasses (low infestation): green foxtail, wild oats, volunteer wheat, volunteer CLEARFIELD wheat, volunteer oats	1 - 6 leaf	Equinox EC: 53 mL/acre PLUS Merge: 0.5 L per 100 L of final spray volume of spray
Annual grasses** (high infestation): green foxtail, wild oats, volunteer wheat, volunteer CLEARFIELD wheat, volunteer oats		Equinox EC: 81 mL/acre PLUS Merge: 0.5 L per 100 L of final spray volume of spray
Perennial grasses: quackgrass**	3 - 6 leaf For optimum control, apply at the 2 - 4 leaf stage prior to tillering (6 to 15 cm in height).	Equinox EC: 101 mL/acre PLUS Merge: 0.5 L per 100 L of final spray volume of spray

Note: Equinox must be used with Merge Adjuvant.

* Use the 40 acre/case rates when weed densities exceed 45 weeds per square meter.

** For optimum control of quackgrass apply at the 2 to 4 leaf stage prior to tillering (6 to 15 cm in height).

† Use higher rate in range when weed densities and overlapping are high, when staging is late, or when weeds are under stress and not growing as actively due to moisture stress or temperature stress.

Tank Mixes

Tank-mix partners	Products rate	Specific comments
In CLEARFIELD canola, CLEARFIELD lentils, field peas, CLEARFIELD Xceed		
Odyssey WDG	Equinox EC @ 54 - 101 mL/acre + Odyssey @ 17 g/acre + Merge @ 0.5% v/v	For control of volunteer CLEARFIELD wheat in addition to other labeled weeds.
In Liberty Link canola		
Liberty 150 SN	Equinox EC @ 54 - 101 mL/acre + Liberty 150 SN @ 1.08 - 1.35 L/acre + Merge @ 0.5% v/v	For greater consistency of control of annual grassy weeds as listed on the Equinox and Liberty 150 and for control of the broadleaf weeds listed on the Liberty 150 label.
In flax (including low linolenic varieties):		
Buctril M	Equinox EC @ 54 - 101 mL/acre + Buctril M @ 400 mL/acre + Merge @ 0.5% v/v	Some leaf burn and retarded growth may delay crop maturity. Avoid application under humid and especially hot, humid conditions.

Equinox EC (cont'd)**Application Information**

How to Apply: With: Ground equipment only. Do not apply by air.

Water volume: 20 - 40.5 L water/ac.

Application Tips

Optimum yield response occurs when weeds are controlled early. Equinox controls grasses present at time of application, and it does not control second flushes. Most effective control is achieved when grasses are actively growing. Weeds stressed by drought, flooding, hot or prolonged cool temperatures ($<15^{\circ}\text{C}$) and poor fertility are more difficult to control. Use the higher of the recommended rates for grasses under stress or for heavy infestations. To maximize control, apply Equinox in warm weather as control may be reduced if temperatures are below 15°C . Allow 4 days between the application of Equinox and any chemical not recommended as a tank mix.

How it Works

Equinox EC herbicide is a systemic herbicide that rapidly enters the target weed through its foliage and translocates throughout the plant. Thorough coverage of the foliage is important for consistent grass control. Once plants are treated, growth is slowed to stopped, generally within 2 days.

Expected Results

The young leaves turn yellow within 5 - 10 days, and some grass species develop a reddish coloration. Necrotic spots then form on the leaves, followed by death. An easy method of detecting whether the treatment has taken effect at an early stage is whether the youngest leaf can be easily pulled out of the leaf sheath. The time required for complete control is normally 7 - 21 days following treatment, depending on growing conditions and crop competition.

Control of quackgrass develops more slowly than control of annual grasses. Equinox EC herbicide is translocated through the quackgrass plant to the rhizomes and kills actively growing rhizome buds, as well as above ground vegetation. Dormant rhizome buds will remain unaffected by the spray, and regrowth can occur from these buds. When Equinox EC herbicide is applied according to label directions, the regrowth of the quackgrass will not be significant until 6 - 8 weeks after treatment, depending on growing conditions, crop cultivation practices and crop competition.

Restrictions

Rainfall: is extremely rainfast. Only one hour is required following application.

Pre-harvest interval: All registered crops - 60 days.

Grazing interval: Field peas may be used for grazing following the 60 day pre-harvest interval. Do not graze other treated crops or cut for feed prior to crop maturity.

Re-cropping: Allow a minimum of 14 days between application and re-planting of cereals or grass crops. A general plant-back interval of 40 days is recommended.

Re-entry: Do not enter treated areas until residues are dry.

Environmental Precautions

This product moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of wastes or cleaning equipment.

Runoff: Do not apply where runoff or erosion is likely to occur.

Toxicity

Low oral toxicity. Acute oral LD_{50} (rat) = $> 2,000 - < 3,000$ mg/kg.

Storage

Store the product in a cool, dry, locked, well ventilated area without a floor drain.

Escort



Warning Irritant

Group 2

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Escort (PCP # 23005)	E.I. duPont Canada	Metsulfuron methyl: 60%	Dry flowable	0.25 kg.

Crops

Pasture, rough turf, rangeland, non-crop areas.

Weeds, Staging and Rate

Annual weeds (seedling): Young and actively growing (less than 10 cm tall or across).

Established annual weeds; biennial and perennial weeds: Up to the early bud stage.

Woody species: Mid-June to mid-August after weed species has leafed out but before fall colouration begins.

Rough turf, pasture, rangeland and non-crop areas:		
Weeds controlled or suppressed at 8 grams per acre**		
Canada thistle*	common tansy	dandelion*
kochia ¹ , (except Group 2 resistant kochia)	Russian thistle	scentless chamomile
sow-thistle*	sweet clover	
Weeds controlled at 10 grams per acre**. Above weeds plus Western snowberry		
Weeds controlled at 12 grams per acre**. Above weed species plus wild rose and dandelion		
Rangeland and non crop areas only:		
Woody species controlled at 40 grams per acre**. All of the above weeds plus following		
balsam poplar	willow	
Woody species controlled at 60 grams**. All of the above weeds plus following		
trembling aspen	cherry	

¹ Note Prairie-wide surveys of kochia field have found approximately 90% of kochia populations are Group 2 herbicide resistant. Assume kochia in your field is resistant and it will not be controlled by this product alone.

* Suppression only.

** At rates, add Agral 90, Ag-Surf or Citowett @ 0.2 L per 100 L of spray solution.

Tank Mixes

Tank-mix partners	Products rate/acre	Specific comments
2,4-D amine or ester 500	Escort @ 8 - 12 g + 2, 4-D @ 790 mL + Agral 90, Ag-Surf or Citowett @ 0.2% v/v of spray solution	Apply as a full coverage spray to foliage and stems using equipment that will assure uniform coverage.

How to Apply: With: Ground equipment. Do not apply by air.

Water volume: 40 - 90 L/ac.

Application Tips

Apply as a full coverage spray to foliage and stems using equipment that will assure uniform coverage. Use spray preparation within 48 hours or product degradation may occur. If spray preparation is left standing without agitation, thoroughly agitate before spraying. Avoid overspray or drift to non-target species and aquatic and wildlife habitats.

Escort (cont'd)**How it Works**

Absorbed by foliage. Inhibits cell elongation.

Expected Results

Escort rapidly stops growth of susceptible species; however, typical symptoms (discolouration) may not be noticeable for several weeks after application, depending on growing conditions and weed susceptibility. Warm, moist conditions following treatment promote the activity of Escort while cold, dry conditions may reduce or delay activity. Brush and weeds hardened off by cold weather or drought stress may not be controlled. Degree of control and duration of effect are dependent on the rate used, sensitivity and size of target species, as well as soil moisture and soil temperature.

Restrictions

Rainfall: No rain-free period is specified on the label.

Grazing: Cattle may graze the treated areas on the day of treatment.

Environmental Precautions

Escort is toxic to aquatic organisms and non-target terrestrial plants. Leave a 10 metre buffer zone from the downwind edge of the spray boom to the sensitive areas for rates up to 7 g/acre and 45 metres for rates up to 60 g/acre.

Runoff: Do not apply in areas where surface water from the treatment site can run off to adjacent cropland, or into streams, irrigation water or wells.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg.

Storage

Store in a cool, dry place. Non-corrosive, non-flammable, non-volatile and does not freeze.

Estoprop Plus/Estoprop XT/ IPCO Dichlorprop-D/IPCO Dichlorprop DX/ Turboprop



Warning Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Estoprop Plus (PCP #27968)	Nufarm Agriculture	Dichlorprop: 300 g/L + 2,4-D: 280 g/L	Emulsifiable concentrate	2 x 10.6 L, 114 L, 450 L
Estoprop XT (PCP # 29660)		Dichlorprop: 210 g/L + 2,4-D: 400 g/L		2 x 10 L, 97.1 L
IPCO Dichlorprop-D (PCP#27966)	IPCO	Dichlorprop: 300 g/L + 2,4-D: 280 g/L		2 x 10 L
IPCO Dichlorprop DX (PCP# 29664)		Dichlorprop: 210 g/L + 2,4-D: 400 g/L		2 x 10L, 115 L
Turboprop 600 (PCP # 27967)	United Agri Products	Dichlorprop: 282 g/L + 2,4-D: 300 g/L		2 x 10 L, 115 L, 450 L

Note: Desormone is registered for non-crop use only.

Crops and Staging

Crop	Stage
Barley (not underseeded with legumes)	4 leaf until early flag leaf
Spring wheat, including durum (not underseeded with legumes)	4 leaf until early flag leaf
Winter wheat	In spring, from full tillering to the early flag leaf
Non-crop areas: roadsides, utility lines, railway rights-of-way	Apply during the month of May or in early fall

Weeds, Staging, and Rate

Agricultural Uses: Apply when weeds are young and actively growing, unless otherwise noted.

Industrial Uses: Apply during the month of May or in early fall.

Agricultural use: Field crops: Weeds controlled at 0.71 L/acre, Estoprop Plus, Estoprop XT/Dichlorprop DX at .486 L/acre		
annual sow-thistle	kochia (apply before plants are 5 cm high)	shepherd's-purse
ball mustard	lady's-thumb (apply before the 4-leaf stage)	smartweed (apply before the 4-leaf stage)
bluebur	lamb's-quarters	stinkweed
burdock	night-flowering catchfly (spring annuals only)	stork's-bill
Canada thistle (top growth control only)	oak-leaved goosefoot	tartary buckwheat
cocklebur	perennial sow-thistle (top growth only)	tumble mustard
curled dock (top growth control only)	prickly lettuce *** (2 to 12-leaf stage)	volunteer canola
dandelion (season-long control)	ragweed	volunteer sunflower
dog mustard	redroot pigweed	wild buckwheat
flixweed	round-leaved mallow	wild mustard
hare's-ear mustard	Russian pigweed	wormseed mustard
Indian mustard	Russian-thistle (before plants are 5 cm high)	
Industrial uses: Roadsides, utility lines, railway rights-of-way. Weeds controlled at 1.6 L/acre with Estoprop Plus, 1.11 L/acre with Estoprop XT/Dichlorprop DX (in addition to above ag weeds)		
alfalfa	dogbane	sweet clover
bull thistle	goat's-beard	tansy
burdock	goldenrod	teasel
buttercup	hawkweed	toadflax
Canada thistle	horsetail (partial control)	vetch
chicory	milkweed (top kill)	wild carrot
cinquefoil	mullein	yellow rocket
curled dock	perennial sow thistle	
dandelion	plantain	
Brush Control		
Brush control at 3.5 L/acre with Estoprop Plus; 2.4 L/acre with Estoprop XT/DichlorpropDX		
hawthorn	sugar maple	wild plum
poplar	white cedar	wild raspberry
scotch pine	wild cherry	

Estaprop Plus/Estaprop XT/ IPCO Dichlorprop-D/PCO Dichlorprop DX/Turboprop (cont'd)

Brush control at 4.7 L/acre with Estaprop Plus; 3.2 L/acre with Estaprop XT/Dichlorprop DX		
alder	ground juniper	rose (some regrowth)
aspen	hardhack	silver maple
balsam fir	hazel	sugar maple
basswood	hickory	sumac
birch	honeysuckle	tamarack
blueberry	manitoba maple	white oak
bur oak	poison ivy	wild apple
elderberry	raspberry	willow
elm	red pine	

* IPCO Dichlorprop-D & Estaprop registered for dandelion control on fall and winter wheat.

** Only IPCO Dichlorprop-D and Estaprop registered for prickly lettuce control in winter wheat.

*** Only for Estaprop XT. Post-emergence application, between full tillering and early flag leaf stage of winter wheat only, of prickly lettuce.

Tank Mixes

Agricultural Field Crops: All 2, 4-D + dichlorprop formulations may be recommended in tank mix with other products. Consult the label of the tank mix partner product, and follow the most stringent set of precautions, restrictions and directions for use.

Industrial Uses

Tank-mix partner	2,4-D + dichlorprop plus tank mix partner	Additional weeds controlled
Vanquish	Turboprop/dichlorprop @ 8.4 L + Vanquish @ 5.2 L / 1000 L spray mix or Estaprop XT/Dichlorprop DX @ 5.7 L + Vanquish @ 6.25 L/1000 L spray mix	Improve control of aspen, poplar and white birch

Application Information

Agricultural uses: Apply with ground or by air.

Water volume: Ground 20 - 80 L/ac. Air - 12 L/ac.

Industrial Uses

Apply with power equipment, knapsack sprayer or by air. Note: Do not apply by air on roadsides.

Water Volume: Broadleaf weeds - 80 - 220 L/acre. Brush control: 300 - 500 L/acre.

When to Apply: Broadleaf weeds: Apply during the month of May or in early fall. Some species may require a second treatment. Spray weed infested areas with an even spray pattern, making sure weeds shielded by high grass are thoroughly wetted. Spray tall weeds to runoff. Brush control: Apply on foliage and stems just before or just after brush is in full leaf in late spring or early fall. Many species may require re-treatment the following year.

Basal treatment (not ash or basswood): Any time of year. Frill treatment: Standing trees more than 13 - 15 cm in diameter. Stump treatment: Immediately after cutting.

Application Tips

Crops under stress from adverse environmental conditions such as excess moisture, drought, disease, etc. may suffer a further setback when Dichlorprop + 2,4-D is applied; however, the crop injury that may occur is usually offset by the benefits of enhanced weed control. Apply in warm weather when the crop and weeds are growing well and the weeds are at a susceptible stage. Avoid application during drought conditions or during exceptionally hot weather.

How it Works

A systemic herbicide absorbed by leaf and stem.

Expected Results

Twisting and curling of weeds will commence 2 - 10 days after application. Growth ceases; eventually plants turn brown and die. Poor results may be expected if poor coverage or low relative humidity during and after spraying.

Estaprop Plus/Estaprop XT/ IPCO Dichlorprop-D/IPCO Dichlorprop DX/Turboprop (cont'd)**Restrictions**

Rainfall: Rain within 3 or 4 hours of application may reduce control.

Grazing: Do not graze or cut treated crops for forage until 40 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Environmental Precaution

2,4-D + dichlorprop formulations are moderately to highly toxic to aquatic organisms. These formulations are also toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. Do not allow spray to drift onto sensitive plants. Do not spray exposed roots of trees and ornamentals. Observe buffer zones specified on the label.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with moderate to steep slope, compacted soil, or clay.

Leaching: The use of these formulations may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 2, 4-D, 300 - 1,000 mg/kg, dichlorprop = 800 mg/kg. Do not spray on foraging bees. Toxic to bees.

Storage

May be stored at any temperature. Shake well after storing for 1 year or longer.

Everest

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Everest (PCP # 26447)	Arysta LifeScience	Flucarbazone-sodium: 70%	Water dispersible granules	567 g

Crops and Staging

Crop	Stage
Spring wheat (including durum)	One leaf to a maximum of four leaves on the main stem, plus two tillers (6 total leaves).

Caution: Do not apply to spring wheat underseeded to legumes

Weeds, Staging and Rate

Weeds	Staging	Rate
Green foxtail only	1 leaf (max 4 main stem leaves plus 2 tillers)	8.7 g/acre + non-ionic surfactant**
Wild oats (population < 100 plants/m ²), green foxtail and volunteer oats	Grasses: 1 - 4 leaves plus 2 tillers	11.5 g/acre + non-ionic surfactant**
Green smartweed, redroot pigweed, shepherd's-purse, volunteer canola*, wild mustard	Broadleaves (except wild mustard): 2 - 6 leaf	11.5 g/acre + non-ionic surfactant**
Stinkweed	2 - 9 leaf	11.5 g/acre + non-ionic surfactant**
Weeds listed above plus wild oats (> 100 plants/m ²)	Grasses: 1 - 4 leaves plus 2 tillers Broadleaves (except wild mustard): 2 - 6 leaf Stinkweed: 2 - 9 leaf	17.4 g plus non-ionic surfactant**

* Will not control volunteer CLEARFIELD canola varieties

** Add non-ionic surfactant such as Agral 90, Ag-Surf, Surf 92, Super Spreader, LI 700 at 0.25% v/v or 0.25 L per 100 L spray solution.

Everest (cont'd)

Tank Mixes

		Everest Rate g/acre		
Tank-mix partner	Tank mix partner rate	Wild oats and green foxtail	Wild oats only	Green foxtail only***
In spring wheat (excluding durum)				
2, 4-D (amine/ester 500)	Up to 0.45 L/acre	17.4 g	11.5 g	8.7 g
Ally + 2,4-D amine or ester 500**	Ally: 2 - 3 g/acre. 2,4-D: up to 0.45 L/acre	17.4 g	11.5 g	8.7 g
Attain	Attain A: 0.24 L/acre. Attain B: 0.4 L/acre	17.4 g	11.5 g	8.7 g
Buctril M	0.4 L/acre	17.4 g	11.5 g	8.7 g
Curtail M	0.6 - 0.8 L/acre	17.4 g	11.5 g	8.7 g
DyVel *	0.51 L/acre	17.4 g	Do not use	8.7 g
DyVel Dsp*	0.35 L/acre	17.4 g	Do not use	8.7 g
Estaprop/Turboprop	0.7 L/acre	17.4 g	11.5 g	8.7 g
Frontline 2,4-D	Frontline 2,4-D A: .040 L/acre. Frontline 2,4-D B: .40 L/acre			
Frontline	Frontline A: .040 L/acre. Frontline B: 0.34 L/acre	17.4 g	11.5 g	8.7 g
MCPA (amine/ester 500)	Up to 0.45 L/acre	17.4 g	11.5 g	8.7 g
Pardner	0.4 L/acre	17.4 g	Do not use	8.7
Prestige	Prestige A: 0.32 L/acre. Prestige B: 0.8 L/acre	17.4 g	11.5 g	8.7 g
Refine SG* + 2, 4-D amine/ester 500	Refine SG: 12 g/acre. + 2,4-D: up to 0.45 L/acre	17.4 g	11.5 g	8.7 g
Target*	0.4 - 0.6 L/acre	17.4 g	Do not use	8.7 g
Spectrum	Spectrum A: 40 mL/acre. Spectrum B: 0.6 L/acre	17.4 g	11.5 g	8.7 g
Thumper	0.4 L/acre	17.4 g	11.5 g	8.7 g
In spring wheat (including durum***)				
2,4-D (amine/ester 500)	Up to 0.34 L/acre.	17.4 g	11.5 g	8.7 g
Frontline	Frontline A: 40 mL/acre. Frontline B: 0.34 L/acre	17.4 g	11.5 g	8.7 g
Spectrum	Spectrum A: 40 mL/acre. Spectrum B: 0.6 L/acre	17.4 g ***	11.5 g	8.7 g

Note: All mixes must be applied with a non-ionic surfactant (Agral 90, Ag-Surf, Surf 92, Super Spreader, LI 700 at 0.25% v/v or 0.25 L per 100 L spray solution, unless otherwise indicated).

* Reduction in wild oat control may be observed with this tank mix partner.

** Addition of a second surfactant is not required

*** Apply specified rate in at least 45 L/acre of water for durum wheat.

Application Information

With: Ground equipment. Do not apply by air.

Water volume: 22.5 - 45 L/acre.

Application Tips

When spraying under the conditions of waterlogged or saturated soils, temperature extremes such as heat or freezing weather, drought, low fertility or plant disease wheat can show unacceptable injury symptoms. Weed control may also be reduced by these same conditions.

How it Works

Flucarbazone-sodium is a systemic herbicide that is absorbed by both leaves and roots and moves rapidly to the growing point of the plant.

Expected Results

Growth of susceptible plants stops soon after application. Symptoms include discolouration (yellowing, reddening and purpling), and complete control may take 1 to 2 weeks.

Restrictions

Rainfall: Do not apply if it is raining or if rainfall is expected within one (1) hour after application.

Grazing: Do not graze treated fields or use green crop for feed. Wheat grain or straw from harvested treated fields may be fed to livestock.

Pre-harvest Interval: Observe minimum interval to harvest of 80 days after treatment.

Re-cropping: The following crops may be planted 11 months after an application of Everest.

Soil zones and rotational crops			
Gray-Wooded	Black	Dark Brown	Brown
Spring wheat	Spring wheat	Spring wheat	Spring wheat
Barley	Barley	Barley	
Canola	Canola	Canola	
Field peas*	Field peas*	Field peas*	
	Field bean	Flax	
	Flax	Durum wheat	
	Spring wheat		

*Field peas can be successfully grown the year following an Everest application providing the following three criteria are all met:

1. Soil pH must be below 7.5.
2. Organic Matter content must be above 4%.
3. Precipitation must be equal to or above the 10 year average (minimum 100mm within 60 days of application in year of application).

Environmental Precautions

Do not allow this chemical to drift onto other crops, especially canola, tame oats, or other non target crops.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg.

Storage

Store in a cool, dry place. Everest 70 WDG is not affected by freezing.

Everest GBX

Group 2, 4

Formulations

Product	Company	Active ingredient	Formula	Container size
Everest 70 WDG (PCP#26447)	Arysta LifeScience	Flucarbazone sodium 70%	WDG	567 grams
Starane GBX (PCP#29670)	Dow AgroScience Canada	Fluroxypyr 180g/L	EC	9.6 Litres

50 Acres per case

Everest GBX (cont'd)**Crops and Staging**

Crop	Stage	Rate
All spring wheat varieties	2 leaf to 4 leaf, 2 tillers	11.5 g/acre Everest GBX
		0.18 L/acre Starane GBX

Note: Everest GBX should not be used alone; refer to tank-mix options.

Weeds, Staging

Grasses: 1 to 6 leaf stage.

Broad leaves: 2 to 4 leaf stage (Refer to tank mix partner labels for additional weed staging information).

Grassy weeds controlled

green foxtail

volunteer oat

wild oat

Broadleaf weeds controlled Everest GBX + 2,4-D*

bluebur

green smartweed

sunflower (annual)

vetch

burdock

goat's beard

plantain

volunteer canola

cleaver (1 - 4 whorls)

hoary cress (top growth)

prickly lettuce

wild buckwheat (1 - 4 leaf)

clover (sweet)

kochia

ragweed

wild mustard

cocklebur

lamb's-quarters

redroot pigweed

wild radish

field horsetail (top growth)

mustard (except green, dog

shepherd's purse

flixweed

and tansy)

stinkweed

*refer to tank mix partner label for additional broadleaf weeds.

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate of herbicide tank mix partner	Adjuvant rate
2,4-D Ester 700*	Spring wheat	0.26 L/acre	0.25 %v/v

*Staging for 2,4-D tankmix is from 4 leaf to 4 leaf, 2 tillers.

Application Information

How to Apply: Ground equipment, do not apply by air.

Water Volume: 45 L/acre.

Application Tips

The activity of Everest GBX combined with 2,4-D Ester herbicide is influenced by weather conditions. Optimum activity requires active crop and weed growth. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost before application (3 days) or shortly after (3 days) may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions or if weed populations are heavy or too far advanced.

How it Works

Flucarbazone sodium is a systemic herbicide that is absorbed by both leaves and roots and moves rapidly to the growing point of the plant. Fluroxypyr and 2,4-D move within the plant to control exposed and underground plant tissue. It mimics naturally occurring plant hormones and controls weeds by disrupting normal plant growth patterns. Symptoms include twisting of stems and swollen nodes.

Expected Results

Flucarbazone sodium causes growth of susceptible plants to stop soon after application. Symptoms include discolouration (yellowing, reddening and purpling), and complete control may take 1 to 2 weeks. Fluroxypyr and 2,4-D cause broadleaf weeds to twist shortly after application. After twisting and bending, plants stop growing, turn brown and die.

Restrictions

Rainfall: Do not apply if rain is expected in 1 hour.

Grazing: Do not feed or graze treated fields. Wheat grain or straw from treated fields may be fed to livestock.

Pre-harvest Interval: Observe minimum interval to harvest of 80 days after treatment.

Re-cropping restrictions: The following crops may be planted 11 months after application.

Black soil zone: Barley, canola (all varieties), durum wheat, field bean, field pea*, flax, spring wheat.

Brown soil zone: Spring wheat.

Dark Brown soil zone: Barley, canola (all varieties), durum wheat, field bean, field pea*, flax, spring wheat.

Gray-Wooded soil zone: Barley, canola (all varieties), field pea*, spring wheat.

* Field peas can be successfully grown the year following an Everest application providing the following three criteria are all met:

1. Soil pH must be below 7.5
2. Organic Matter content must be above 4%.
3. Precipitation must be equal to or above the 10 year average (minimum 100mm within 60 days of application in year of application). Rotational crops can be adversely affected if rainfall is below normal (10 year average) during the year of application.

Everest applications to eroded knolls in the Dark Brown and Black soil zones with low organic matter (less than 2%) and high pH (greater than 7.5) or to Gray Wooded soils with highly variable soil texture and organic matter may result in delayed development or reduced yield of rotational crop.

Environmental Precautions

Do not allow this chemical to drift on to other crops, especially canola, tame oats, or other non target crops.

Toxicity

Flucarbazone sodium has low acute mammalian toxicity. Acute oral LD₅₀ (rat) = >5,000 mg/kg. Fluroxypyr has low acute mammalian toxicity. Acute oral LD₅₀ (rat) = >2,000mg/kg. 2,4-D has moderate acute mammalian toxicity. Acute oral LD₅₀ (rat) = >500mg/kg.

Storage

Store in dry, heated area.



Caution Poison

Express Pro

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Express Pro (PCP # 29212)	E. I. duPont Canada	Tribenuron-methyl: 42.9%, methsulfuron methyl at 8.6%	Soluble granules	Various

Crops and Staging

Crop	Stage
Barley, spring wheat (including durum), winter wheat	1 day prior to seeding
Summerfallow	

Note: Must be mixed with glyphosate (those present as a potassium or isopropylamine or ammonium or trimethylsulfonium salt).

Do not apply to wheat and barley underseeded to legumes or grass.

Express Pro (cont'd)**Weeds Controlled, Rates and Staging****Rates**

Annual and Perennial Weed Burn-off (prior to seeding) in Wheat and Barley and Summerfallow		
Express Pro plus tank mix partner rate	Weeds controlled	Stage
Express Pro @ 7 g/acre + glyphosate acid equivalent at .5 L/acre (360gm AI/L)	Volunteer canola (including glyphosate tolerant)	any stage
	Canada fleabane, cleavers, common ragweed, narrow leaved hawk's beard, scentless chamomile, night flowering catchfly (suppression)	Up to 8 cm
	Chickweed	1 - 6 leaf
	Dandelion, downy brome, flixweed, giant foxtail, green foxtail, hemp nettle, kochia, lady's thumb, lamb's-quarters, Persian damel, redroot pigweed, Russian thistle, stinkweed, volunteer barley, volunteer flax, volunteer wheat, wild mustard, wild oats	up to 15 cm
	Cow cockle, wild buckwheat	up to 3 - leaf

Rate

Express Pro 6 g/ac + ½ L glyphosate (360 g active ingredient/L)

Tank Mixes

If using lower than the ½ L rate of glyphosate, adjuvant is required with the mix.

Application Information

Ground application only.

Water volume: Ground (22.5 - 45 L/acre).

Application Tips

Do not use more than 7 gm/ac/year. Do not apply to crops underseeded to legumes or grasses. With any summerfallow treatment, allow at least 10 days to elapse between treatment and tillage. Only weeds emerged at time of application will be controlled. Weeds must be actively growing at time of application or control might be reduced. Do not re-enter treated fields until 12 hours after application. Once dissolved, Express® Pro herbicide will not settle out, even if the sprayer is parked for long periods of time. Spray preparation should be used within 24 hours or product degradation may occur.

How it Works

Express® Pro herbicide rapidly stops growth of susceptible weeds. However, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 to 3 weeks after application, depending on growing conditions and weed susceptibility. Degree of control and duration of effect depend on weed sensitivity, weed size, spray coverage and growing conditions. Activity of the herbicide mixture may be delayed by cold, dry conditions after application.

Rainfall: Heavy rainfall immediately after application may wash the herbicide off the foliage, which may reduce the effectiveness of Express® Pro herbicide. Do not apply if rain is forecast for the time of application

Restrictions

Re-cropping: Fields treated with Express® Pro herbicide may be seeded to wheat (spring, durum or winter) or spring barley a minimum of 24 hours after application. The following crops may be seeded 10 months after application: Canola, peas and flax.

Environmental Precautions

Buffer zone guideline: Toxic to aquatic organisms and non-target terrestrial plants. Use a buffer zone of 4 metres for terrestrial habitats and 1 metre minimum for aquatic habitats.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Runoff: To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Site characteristics and conditions that may lead to runoff include, but are not limited to: heavy

rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g. soils that are compacted or fine textured such as clay).

Toxicity

Tribenuron methyl: Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg. Metsulfuron methyl : Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = > 5,000 mg/kg.

Storage

Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed.

Express SG

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Express SG (PCP # 28262)	E. I. duPont Canada	Tribenuron-methyl: 50%	Soluble granules	480 g bottle

Note: Express SG is purchased alone but must be tank mixed with either 2, 4-D ester or glyphosate before use.

Crops and Staging

Crop	Staging	Comments
Barley, spring wheat (including durum), winter wheat, oats, canary seed, pulses (including dry beans*, fababeans*, lupins*, field peas*, soybeans*)	1 day prior to seeding	Must be tank mixed with glyphosate.
Pasture and rangeland	Early bud to prebloom for weeds	Use a minimum of 22.5 L/acre of water.
Summerfallow		Must be tank mixed with 2,4-D.

* Express SG should not be used prior to registered pulse crops on soils with greater than 60% sand or less than 3% organic matter.

Tank Mixes (Weeds, Staging)

Annual and perennial weed burn-off (prior to seeding) in cereals and pulse crops			
Tank-mix partner	Express SG plus tank mix partner rate	Weeds controlled	Stage
Glyphosate (present as potassium salt, isopropylamine salt, ammonium salt or trimethylsulfonium salt)	Express SG @ 6 g/acre + glyphosate acid equivalent at .5 L/acre (360gm AI/L)	Canada fleabane, common ragweed, narrow leaved hawk's beard, scentless chamomile (suppression)	Up to 8 cm
		dandelion, downy brome, flaxweed, giant foxtail, green foxtail, hemp nettle, kochia, lady's thumb, lamb's-quarters, Persian dandelion, redroot pigweed, Russian thistle, stinkweed, volunteer barley, volunteer canola (including glyphosate-tolerant varieties), volunteer flax, volunteer wheat, wild mustard, wild oats	Up to 15 cm
		cow cockle, wild buckwheat	Up to 3 leaf
		Canada thistle (suppression), white cockle (suppression)	Rosettes

Express SG (cont'd)

Annual and perennial weed burn-off (prior to seeding) in cereals and pulse crops			
Tank-mix partner	Express SG plus tank mix partner rate	Weeds controlled	Stage
	Express SG @ 6 g/acre + glyphosate acid equivalent at .3 L/acre (360gm AI/L) + Agral 90 @ 0.35% v/v	volunteer canola (including glyphosate tolerant)	Any stage
		narrow leaved hawk's-beard (suppression)	Seedlings and rosettes
		green foxtail, lady's thumb, stinkweed, volunteer barley, volunteer wheat, wild buckwheat (1-3 leaf), wild mustard, wild oats (1-3- leaf)	Up to 8 cm
		kochia, lamb's-quarters, redroot pigweed (suppression), Russian thistle (suppression)	Up to 10 cm
	Express SG @ 6 g/acre + glyphosate acid equivalent at 0.4 L/acre (360 g/L AI) Agral 90 @ 0.35 % v/v	dandelions (top growth), Canada thistle (top growth) (suppression)	Rosettes (non-flowering)
Summerfallow			
2,4-D ester LV-700	Express SG @ 6 g/acre + 2,4-D ester @ 0.24 L/acre.	flixweed, stinkweed	Fall rosettes and spring seedlings
Rangeland and pasture			
	Express SG @ 6 g/acre alone	tall buttercup, narrow leaved hawk'sbeard (season long control)	Early bud to pre-bloom
	Express SG @ 12 g/acre	dandelion, white cockle, common tansy	Early bud to pre-bloom

Application Information

Apply with ground equipment. Do not apply by air.

Water volume: 40 L/ac.

Application Tips

Effectiveness may be reduced if spray mixture remains in the tank for more than 24 hours.

How it Works

Absorbed by foliage and roots, inhibits cell elongation.

Expected Results

Express SG stops the growth of susceptible weeds immediately. However, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed susceptibility. Degree of control and duration of effect depend on weed sensitivity, weed size, spray coverage and growing conditions.

Restrictions

Rainfall: If rain occurs soon after application, control may be reduced; 1 hour of dry weather is needed to allow Express SG to be absorbed by weed foliage.

Re-cropping: A minimum recropping interval of 2 months should be left between the application of Express SG and seeding of the next crop. The following crops can be seeded two months after application of Express SG herbicide: canola, flax, lentils and alfalfa.

Environmental Precautions

Overspray or drift to important wildlife habitats such as shelterbelts, wetlands, sloughs or dry slough borders, or woodlots should be avoided. Do not contaminate irrigation water. Toxic to aquatic organisms.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg. May irritate eyes, nose, throat and skin.

Storage

Store in a cool, dry place.

FirstStep Complete/Spike-Up

Group 2, 9

Formulations

Product	Company	Active ingredient	Formulation	Container size
FirstStep (PCP # 29569)	E.I. duPont Canada	75% tribenuron methyl	Dry flowable solution	240 g FirstStep
StartUp (PCP # 29498)	Monsanto Canada	540 g/L glyphosate		2 x 10L jugs of glyphosate
Spike-Up (Spike PCP # 29653)	NuFarm Agriculture Inc.	Tribenuron methyl: 75%	Dry flowable	160 g, 4 x 900 g
Credit (PCP # 25866)		Glyphosate: 356 g/L	Solution	2 x 10 L, 450 L

One case FirstStep Complete treats 60 acres. One case of Spike-Up will treat 40 acres.

Crops and Staging

Crop	Stage	Rate
Pre-seed burndown (prior to planting barley, winter wheat and spring wheat, including durum); summerfallow applications	Pre-seed burndown, summerfallow	FirstStep/Spike: 4 g/acre
		StartUp: 0.33 L/acre
		Spike-Up: 0.5 L/acre

Note: Crop Stage: Apply to fields at least 24 hours prior to seeding of spring wheat (including durum) or barley. If used in summerfallow, allow at least 10 days to elapse before tillage.

Tank Mixes

None.

Weeds

Summerfallow: (Control of fall rosettes and spring seedlings of narrow-leaved hawk's beard and stinkweed). Apply the tank mix in the spring after emergence, up to early flowering stage. Only the weeds that have emerged at the time of application will be controlled.

Grassy weeds controlled

downy brome
giant foxtail

green foxtail
volunteer cereals

wild oats
persian darnel

Broad-leaved weeds controlled

Canada fleabane
Canada thistle*
cow cockle
common ragweed
dandelion (up to 15 cm across)
flixweed
hemp-nettle

kochia
lady's thumb
lamb's quarters
narrow leaved hawk's beard
redroot pigweed
Russian thistle
stinkweed

volunteer canola (including glyphosate tolerant)
volunteer flax
wild buckwheat
wild mustard

*Suppression

On summerfallow: Will control fall rosettes and spring seedlings of narrow-leaved hawk's-beard and stinkweed.

FirstStep Complete/Spike-Up (cont'd)**Application Information**

Apply with: Ground equipment. Do not apply by air.

Water volume: Apply at 40 - 80 L/acre rate of water for FirstStep, 22 - 45 L/ac for Spike-Up.

Application Tips

Warm, moist growing conditions promote active weed growth and enhance the activity of FirstStep Complete. Degree of control and duration of effect depend on weed sensitivity, weed size and growing conditions. Weeds hardened off by cold weather or drought stress may show delayed symptoms and result in reduced levels of weed control. Effectiveness may be reduced if spray mixture remains in the tank for more than 24 hours.

How it Works

FirstStep/Spike are absorbed by foliage and roots, inhibits cell elongation. StartUp/Spike-Up are non selective systemic herbicides that move through the foliage into the roots, resulting in plant mortality.

Expected Results

FirstStep/Spike rapidly stop growth of susceptible weeds; however, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 to 3 weeks after application, depending on growing conditions and weed susceptibility. Annual weeds susceptible to StartUp/Spike-Up will wilt and yellow with 2-4 days. Perennial weeds will wilt and yellow with 7-10 days.

Rainfall: If rain occurs within 4 - 6 hour after application, control may be reduced.

Movement in Soil: FirstStep/Spike move little in the soil. StartUp/Credit have negligible leaching in the soil.

Restrictions

Re-cropping: FirstStep Complete/Spike-Up have a minimum re-cropping interval of 2 months between application and seeding of canola, flax, lentils and alfalfa.

Grazing: Do not graze treated areas within 7 days of application.

Toxicity

FirstStep/Spike and StartUp/Credit have a very low acute mammalian toxicity. FirstStep/Spike have an acute oral LD₅₀ (rats) = >5,000mg/kg. StartUp/Credit have an acute oral LD₅₀ (rats) = 4,320 mg/kg. Non-toxic to bees, birds and fish.

Storage

Store in cool, dry place.



Caution Poison

FlaxMax DLX

Group 1, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Equinox EC (PCP # 276030)	BASF Canada	Tepraloxym: 200 g/L	Emulsifiable concentrate	1.62 L
FlaxMax (PCP # 23993)		Clopyralid: 50 g/L + MCPA ester: 280 g/L		2 x 8.0 L
Merge adjuvant (PCP # 21058)		Surfactant blend: 50%	Solution	4.05 L

Crop and Stage

Flax (excluding low linolenic varieties)

Weeds, Staging and Rate

Equinox @81 mL/acre plus Flaxmax @ 0.8 L/acre (one case will treat 20 acres)

Annual grasses: apply at 1 - 6 leaf stage			
green foxtail	volunteer barley	volunteer oats	volunteer wheat
wild oats			
Annual broadleaves: apply at 2 - 4 leaf stage			
annual sow-thistle	red root pigweed	smartweed	volunteer sunflower
common groundsel	Russian pigweed	stinkweed	wild buckwheat
flixweed	scentless chamomile	tartary buckwheat	wild mustard
lamb's-quarters	shepherd's-purse	volunteer canola	
Perennial weeds			
Canada thistle*	dandelion**	perennial sowthistle***	

* Apply from 10 cm until early bud stage. This treatment will provide season long control of light Canada thistle infestations with some regrowth in the fall.

** Apply at the spring rosette stage.

*** When applied to top growth.

Tank Mixes

None.

Application Information

How to Apply: With: Ground equipment.

Water volume: 40 L/ac.

Application Tips

Ensure thorough and uniform spray coverage over the entire leaf area of the target weeds. When weeds are stressed due to drought, flooding or prolonged hot or cool temperatures (15°C or less), control can be reduced or delayed. Do not spray FlaxMax DLX if temperatures of +5°C or lower are forecasted within 3 days of application. Weed escapes may occur under prolonged stress conditions or low fertility. Do not make applications to weeds stressed longer than 20 days due to lack of moisture as unsatisfactory control can result.

How it Works

Tepraloxymid is a contact and systemic herbicide. Uptake is primarily through the leaves, and thorough coverage of foliage is important for consistent control. Susceptible annual grasses stop growing and slowly turn brown. Clopyralid is a growth regulator type of herbicide, which is primarily absorbed through the foliage and is translocated to all parts of the plant causing leaves and stems to twist, yellow and then die. MCPA is a systemic herbicide for broadleaf weeds that is translocated throughout the plant causing rapid undifferentiated growth, which usually results in the death of susceptible weeds.

Expected Results

Grasses: Susceptible annual grasses stop growing and slowly turn brown. Complete control takes 7 - 21 days. **Broadleaf weeds:** Weeds start to twist after spraying; after twisting and bending, plants turn brown and die. Difficult to control weeds such as Canada thistle and wild buckwheat stop growing, change colour to dark green and then turn yellow before they die. Death may not occur for 14 - 21 days after application. Some weak Canada thistle regrowth may occur by the end of the season.

Restrictions

Rainfall: Do not apply if rain is forecast within 6 hours of application.

Pre-harvest interval: Canola, Clearfield canola, Clearfield lentil, lentils, field peas and flax - 60 days.

Grazing interval: Field peas may be used for grazing following the 60 day pre-harvest interval. Do not graze other treated crops or cut for feed prior to crop maturity.

FlaxMax DLX (cont'd)

Re-cropping: Fields previously treated with FlaxMax DLX herbicide can be seeded to wheat, barley, oats, rye, corn, flax, canola, sugar beets, mustard, or they should be summerfallowed. Field peas can be grown the following year (10 months after application). Do not seed to crops other than those listed above for at least one clear year following treatment.

Re-entry: Do not enter treated areas until residues are dry.

Environmental Precautions

This product is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of wastes or cleaning of equipment.

Runoff: Do not apply where runoff or erosion is likely to occur.

Toxicity

Tepraloxycim: Low oral toxicity. Acute Oral LD_{50} = 2,000 - 3,000 mg/kg.

Clopyralid: Very low acute mammalian toxicity. Acute oral LD_{50} (rats) = >2,000 mg/kg. Extremely low toxicity to fish.

MCPA: Moderate acute mammalian toxicity. Acute oral LD_{50} (rats) = technical 700 - 880 mg/kg.

Storage

Store the product in original, tightly-closed container and do not allow water to be introduced into this container. Store the product in a cool, dry, locked, well ventilated area without a floor drain.

Fortress

Group 3, 8

Formulations

Product	Company	Active ingredient	Formulation	Container size
Fortress (PCP # 15921)	Gowan Canada	10% triallate + 4% trifluralin	Granules	22.7 kg, 454 kg

Crops and Staging

Crop	Stage
Barley Flax* Mustard Rapeseed including canola Wheat (spring and durum)	Fall preplant incorporated: apply in the fall after September until soil freeze up. Spring preplant incorporated: prior to seeding

* Do not use on low linolenic acid varieties.

Weeds Controlled

green foxtail
wild oats

yellow foxtail

Annual broadleaves suppressed

kochia
red root pigweed

lamb's-quarters
Russian thistle

wild buckwheat

Rate

Apply Fortress according to soil organic matter contents.

Crop	Organic matter contents (%)				
	< 2%	2 - 4%	4 - 6%	> 6%	> 8%
Fall granular applications (kg/acre)					
Barley	4.5	5.7	5.7	6.9	6.9
Wheat (spring and durum)	—	4.5	5.7	5.7	6.9
Flax, mustard, rapeseed	5.7	5.7	5.7	6.9	6.9
Spring granular applications (kg/acre)					
Barley	4.5	5.7	5.7	6.9	5.0 - 7.5
Wheat (spring and durum)	—	—	4.5	5.7	5.0 - 7.5
Flax, mustard, rapeseed	5.7	5.7	5.7	6.9	As desired

Incorporation

Time: First incorporation within 24 hours; second incorporation can be either in the fall or spring. Do not incorporate greater than 2 inches (5 cm) deep to avoid herbicide dilution.

Implement: Use a double disc or light duty cultivator plus harrows. Harrowing does not provide effective incorporation if compacted soil prevents penetration of harrow teeth, if trash accumulates in harrow section or if harrows bounce.

Application Tips

Calibrate equipment to deliver desired amount of product. Use only a hoe-drill or a double disc press drill to seed barley or wheat into a Fortress-treated field. Do not apply to soil with less than 2% organic matter if it is to be seeded to wheat. Do not apply Fortress for wheat on land that has been treated with trifluralin since June 1 of the previous year.

Seeding: Flax, mustard and rapeseed can be seeded in treated layers. Barley and wheat are more sensitive and should be planted 6.0 - 7.5 cm. Wheat must be seeded at least 1.0 cm below the treated layer. Do not seed deeper than 7.5 cm. To ensure an even crop stand, increase the usual seeding rate of barley and wheat by 10%. Seed into warm, moist seedbed.

Fall surface application: Where fields are prone to water and/or wind erosion and fall tillage is therefore undesirable, fall surface applications should be made after October 15 or within three weeks of soil freeze-up (average soil temperature at the 5 cm depth should be 4°C or less). Fall surface application should be made to standing stubble, chemical fallow or summerfallow fields in a state of low soil erodibility. Avoid smooth, hard packed soil conditions in summerfallow, which may allow granules to drift. Surface applications should not be made to fields covered in snow or that have excessive crop residue, which will not allow granules contact with soil. Under excessively warm and/or wet conditions between application and crop emergence, control may be reduced. For best results under heavy wild oat infestations, use the incorporated treatments only.

How it Works

Absorbed by wild oat shoots and foxtail roots, usually resulting in death before emergence. Under dry conditions, some wild oats and foxtail may emerge before being killed.

Expected Results

Weeds: Wild oats and foxtail die before they emerge. Weed control may be reduced under conditions of prolonged, cool soil temperatures at the time of germination or extreme drought in spring.

Crops: Thinning in barley and wheat are known to occur under conditions of heavy rainfall and/or cold weather after application and before crop emergence. In most cases, thinning is more than offset by tillering. Some thinning may be noted on eroded knolls. Poor results may be expected if there is incomplete incorporation due to wet, cloddy soil or heavy trash, very dry soil conditions in spring or prolonged cool soil temperatures at time of germination. Ridges left by seeding may disrupt the treated layer and allow escapes.

Fortress (cont'd)**Restrictions**

Rainfall: Moisture is required for activation. Rainfall of at least 1.5 cm within 2 weeks of application in the spring is required to ensure maximum performance.

Grazing: Grazing restrictions: Do not graze the treated crop or cut for hay; there are not sufficient data to support such use.

Re-cropping: Under normal conditions, Fortress carryover will not harm crops grown in rotation. As a precaution, tame oats, sugar beets, creeping red fescue and small-seeded grasses such as timothy and canary seed should not be grown in rotation following a Fortress-treated crop.

Environmental Precautions

Do not apply this product directly to aquatic habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff: Do not apply where runoff or erosion is likely to occur.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = >5,000 mg/kg. May cause skin and eye irritation.

Storage

Store in a dry place.



Caution Poison

Frontline XL

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Frontline XL (PCP # 28804)	Dow AgroSciences	Florasulam: 4g/L + MCPA ester: 280 g/L	Emulsifiable concentrate	2 x 10 L, 120 L drum

One case treats 40 acres, and a drum treats 240 acres

Crops and Staging

Crop	Stage
Spring wheat (including durum), barley, oats	2 - 6 leaf stage

Weeds, Staging, and Rate

Apply at 0.506 L/acre

Weeds controlled at 2 - 4 leaf stage			
annual sunflower	common ragweed	Russian pigweed	wild buckwheat
ball mustard	flixweed	shepherd's purse	wild mustard
burdock	hempnettle	smartweed	volunteer canola*
cleavers	lamb's- quarters	stinkweed	

Weeds suppressed at 2 - 4 leaf stage		
annual sow-thistle	dandelion (seedlings and overwintered rosettes less than 15 cm)	perennial sow-thistle
Canada thistle		plantain (top growth)
		stork's bill

* Including all herbicide-tolerant canola varieties

Tank Mixes

Tank-mix partner	Frontline XL plus tank mix partner rate	Additional weeds controlled
In spring wheat (including durum) and barley:		
Assert	Frontline XL @ 0.5 L/acre + Assert @ 0.65 L/acre + Acidulate	wild oats
In spring wheat (including durum) only:		
Everest	Frontline XL @ 0.5 L/acre + Everest @ 17.4 g/acre + Agral 90 @ 0.25 % v/v	wild oats and green foxtail
Horizon, Nextstep, Foothills, Signal	Frontline XL @ 0.5 L/acre + Horizon @ 93 mL/acre + Score @ 0.8% v/v	wild oats
	Frontline XL @ 0.5 L/acre + Horizon @ 117 mL/acre + Score @ 1.0 % v/v	wild oats and green foxtail
Simplicity	Frontline XL @ 0.5 L/acre + Simplicity @ 200 mL/acre	wild oats and green foxtail
In spring wheat (excluding durum) and barley		
Axial	Frontline XL @ 0.5 L/acre + Axial @ 243m L/acre + Adigor @ 283 mL/acre	wild oats, green foxtail, volunteer oats

Application Information

With: Ground equipment only. Do not apply by air. Water volume: 40 L/ac.

Application Tips

Do not apply to crops underseeded to legumes. Apply Frontline early post-emergence to the main flush of broadleaf weeds. Warm, moist conditions that promote active weed growth, small weed size and competitive crop and good growing conditions after application will optimize the weed control. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed, and regrowth may occur. For best results, ensure adequate spray coverage of the target weeds. Only weeds that are emerged at time of application will be controlled. If the foliage of the weed is wet at the time of application, control may be reduced.

How it Works

Frontline XL herbicide contains a Group 2 and a Group 4 mode of action herbicide. The Group 2 mode of action herbicide inhibits the production of the ALS enzyme in plants. This enzyme is essential for the production of certain amino acids required for plant growth. The Group 4 mode of action herbicide disrupts normal plant growth regulation, resulting in death of susceptible plants.

Expected Results

Weeds susceptible to Frontline will stop growing almost immediately. The weeds turn yellow or reddish. Symptoms such as yellowing and red colouration may not be noticeable for 1 - 2 weeks. Some twisting may also be observed on weeds sensitive to MCPA. Warm, moist conditions, small weed size and competitive crop will optimize weed control provided by Frontline.

Restrictions

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage, and a repeat treatment may be required. Do not apply if rainfall is forecast for the time of application.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Do not harvest forage or cut hay within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Do not harvest the treated crop within 60 days after application.

Frontline XL (cont'd)**Environmental Precautions**

Highly toxic to aquatic organisms and non-terrestrial plants. Observe buffer zones specified under Directions for Use on the label.

Runoff: To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Drift: Do not allow spray mist to drift since drift can cause damage to non-target crops and plants. Do not apply when winds are gusty or in excess of 15 km/h. When spraying, avoid combinations of pressure and nozzle type that will result in fine particles (mist), which are more likely to drift.

Toxicity

Frontline XL is practically non-toxic to birds. Acute oral LD₅₀ is > 2,000 mg/kg. Frontline XL is also moderately toxic to fish.

Storage

Store in a dry, heated storage. If products are frozen, bring to room temperature and agitate before use.



Caution Poison

Frontline 2,4-D

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Frontline 2,4-D A (PCP # 27242)	Dow AgroSciences	Florasulam: 50g/L	Suspension concentrate	1.6 L
Frontline 2,4-D B (PCP # 27243)		2,4-D LV ester: 564 g/L	Emulsifiable concentrate	2 x 8 L

Crops and Staging

Crop	Stage
Spring wheat (including durum)	3 leaf fully expanded to 6 leaf

Weeds and Staging**Weeds controlled at the 2 - 4 leaf stage**

annual sow thistle	common ragweed	plantain	vetch
annual sunflower	dandelion*	prickly lettuce	volunteer canola***
ball mustard	flixweed	redroot pigweed	wild buckwheat
bluebur	kochia**	Russian thistle	wild mustard
burdock	lady's-thumb	shepherd's-purse	wild radish
chickweed	lamb's-quarters	smartweed	
cleavers	narrow-leaved hawk's-	stinkweed	
cocklebur	beard****	tartary buckwheat	

Weeds suppressed at 2 - 4 leaf stage

Canada thistle (top growth only)	hemp nettle	perennial sow thistle (top growth only)
----------------------------------	-------------	---

* Seedlings and overwintering rosettes.

** Up to 5 cm in height.

*** All types of volunteer canola including herbicide tolerant.

**** 1 - 2 leaf stage.

Rates

Frontline 2, 4-D A: 40 mL/acre. Frontline 2, 4-D B: 404 mL/acre. Note: one case treats 40 acres.

Tank Mixes

Tank-mix partner	Frontline 2,4-D plus tank mix partner rate	Additional weeds controlled
Assert	Frontline 2,4-D A @ 40 mL/acre + Frontline 2,4-D B @ 404 mL/acre + Assert @ 0.65 L/acre + Acidulate	wild oats
Everest	Frontline 2,4-D A @ 40 mL/acre + Frontline 2,4-D B @ 404 mL/acre + Everest @ 17.4 g/acre L/acre + Ag Surf or Agral 90 @ 0.25% v/v	wild oats and green foxtail
Simplicity	Frontline 2,4-D A @ 27 mL/acre + Frontline 2,4-D B @ 248 mL/acre + Simplicity @ 150 - 200 mL/acre	At the 200 mL/acre rate of Simplicity, the mix will control wild buckwheat and labeled weeds. The lower rate of 150 mL/acre will control wild oats at < 75 plants/metre ² . The reduced rate will not provide added broadleaf control.

Application Information

With: Ground equipment only. With a sprayer that can apply 40 L/ac of spray solution. Do not apply by air.

Water Volume: 40 L/ac.

Application Tips

Do not apply to crops underseeded to legumes. Apply Frontline 2,4-D early post-emergence to the main flush of broadleaf weeds. Warm, moist conditions that promote active weed growth, small weed size, competitive crop and good growing conditions after application optimize weed control. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed, and re-growth may occur. For best results, ensure adequate spray coverage of the target weeds. Only weeds that are emerged at time of application will be controlled. If the foliage of the weed is wet at the time of application, control may be reduced.

How it Works

Florasulam SC is taken up by leaves and stops growth of susceptible weeds rapidly via inhibition of the ALS enzyme. 2,4-D is a systemic, non-selective herbicide, which readily moves through the foliage and root system. It inhibits pigment, including chlorophyll, leading to plant death.

Expected Results

Florasulam A symptoms will initially appear in the upper regions of the plant. Newer leaves start to yellow and wilt, followed by a loss of green colour. Symptoms will spread to the rest of the plant with some weeds showing purpling or reddening. Under ideal conditions, complete control may occur within 7 - 10 days after application. Plants susceptible to 2,4-D will become malformed before they die.

Restrictions

Rainfall: Do not apply if rainfall is expected within 2 hours.

Grazing: Do not harvest as forage within 30 days after application. Do not permit lactating dairy animals to graze fields within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Do not harvest the treated mature crop within 60 days after application.

Re-cropping: Fields previously treated with Frontline 2,4-D tank mix can be seeded the following year to barley, canola, oats, peas, wheat, or fields can be summerfallowed.

Environmental Precautions

Frontline 2, 4-D is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. This product has potential to leach. Do not apply excessive irrigation.

Drift: Overspray or drift to sensitive habitats should be avoided. A buffer zone of 30 metres is required between the downwind edge of the boom and the closest edge of sensitive terrestrial habitats including forested areas, shelter belts, woodlots, hedgerows, and shrublands. A buffer zone of 5 metres is required between the downwind edge of the boom and the closest edge of sensitive aquatic habitats.

Frontline 2,4-D (cont'd)

Toxicity

2,4-D A is highly toxic to aquatic organisms. It is also slightly toxic to birds. 2, 4-D B has a moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) 982 mg/kg. It can cause skin irritation and can be absorbed through the skin.

Storage

Store in dry, heated storage. If products are frozen, bring to room temperature and agitate before use.



Caution Poison



Warning Irritant

Glyphosate

Group 9

Formulations

Product	Company	Active ingredient	Formulation	Container size
Cheminova Glyphosate Soluble Concentrate Herbicide (PCP# 26828)	Cheminova	356 g/L	Solution	10 L
Clearout 41 (PCP# 28322)	Albaugh Inc.	360 g/L	Solution	115 L, 1000 L
Credit (PCP# 25866)	Nufarm Agriculture	356 g/L	Solution	10 L, 450 L
Credit 45 (PCP# 29124)	Nufarm Agriculture	450 g/L	Solution	10 L, 115 L, 450 L, 1000 L
Factor 540 (PCP# 27988)	IPCO	540 g/L	Solution	10 L, 115 L, 450 L
Glyfos (PCP# 27287)	Cheminova	360 g/L	Solution	10 L, 150 L, 450 L, 1000 L
Glyphogan Plus (PCP# 29219)	MANA Canada	356 g/L	Solution	10 L, 750 L tote
KnockOut Extra (PCP# 29266)	Libertas Now Inc.	360 g/L	Solution	9.5 L, 30 L, 113 L, 940 L, 1040 L
Maverick III (PCP# 29033)	Dow AgroSciences	480 g/L	Solution	10 L, 115 L, 450 L
MPower Glyphosate (PCP# 29290)	NewAgco Inc	360 g/L	Solution	640 L, 1000 L
NuGlo (PCP# 29470)	Nufarm Agriculture	450 g/L	Solution	10 L, 450 L, 1000 L
Polaris (PCP# 29479)	NuFarm Agriculture	360 g/L	Solution	10 L
R/T 540 (PCP# 28487)	Monsanto	540 g/L	Solution	10 L, 115 L, 450 L
Roundup Transorb HC (PCP# 28198)	Viterra	540 g/L	Solution	10 L, 115 L, 450 L, 1150 L
Roundup Ultra 2 (PCP# 28486)	Monsanto	540 g/L	Solution	10 L, 115 L, 450 L
Roundup WeatherMax (PCP# 27487)	Monsanto	540 g/L	Solution	10 L, 115 L, 450 L, 1150 L
Sharpshooter (PCP# 28631)	United Agri Products	356 g/L	Solution	10L, 1000L
Sharpshooter Plus (PCP# 28623)	United Agri Products	360 g/L	Solution	10L, 1000L
StartUp (PCP# 29498)	Viterra	540 g/L	Solution	10 L, 115 L, 450 L, 667 L
Touchdown Total (PCP# 28072)	Syngenta	500 g/L	Solution	10L, 115L, 450L
Traxion (PCP# 29201)	Syngenta	500 g/L	Solution	450L
Vantage Plus Max II (PCP# 28840)	Dow AgroSciences	480 g/L	Solution	10L, 115L, 450L
Wise Up (PCP# 29126)	Adjuvants Plus Inc.	356 g/L	Solution	115L, 1000L

Glyphosate (cont'd)**Cropland Uses**

Annual weed control prior to crop emergence or in summerfallow - all crops.

Quackgrass control - prior to seeding or after harvest.

Canada thistle control - summer-fallow, shelterbelts and post-harvest.

Dandelion control - prior to crop emergence or post harvest.

Other perennial weeds control - summerfallow, shelterbelts and post-harvest.

Spot treatments (in-crop) of perennial weed control - cereals, corn, soybean and forages.

Pre-harvest control of quackgrass, Canada thistle, milkweed, toadflax, dandelion, season-long control of perennial sow-thistle, and harvest management.

Weed control in glyphosate tolerant crops: canola, corn and sugar beet.

Post-harvest stubble treatments - all crops.

Weed control in non-crop areas: industrial, right-of-way, recreational and public areas.

Brush control, turf renovation, directed application in woody nursery stock, roadsides and shelterbelts.

Weeds Controlled**Annual**

annual bluegrass	downy brome	narrow-leaved vetch	stinkweed
annual sow-thistle	flixweed	night-flowering catchfly	stork's-bill
barnyard grass	green foxtail	Persian dandelion	volunteer flax
Canada fleabane	green smartweed	prickly lettuce	volunteer mustard
common chickweed	hemp-nettle	red root pigweed	volunteer wheat
common ragweed	kochia	round-leaved mallow	wild mustard
corn spurry	lady's-thumb	Russian thistle	wild oats
crabgrass	lamb's quarters	shepherd's-purse	wild tomatoes
dodder	narrow-leaved hawk's beard	smooth pigweed	

Perennial

alfalfa	curled dock	japanese knotweed	smooth brome grass
Canada bluegrass	dandelions	kentucky bluegrass	toadflax
Canada thistle	field bindweed	perennial sow-thistle	wormwood
cattails	foxtail barley	poison-ivy	yellow nutsedge
common milkweed	hemp dogbane	purple loosestrife	
cottontop	hoary cross	quackgrass	

Brush

alder	douglas fir	poplar	snowberry
birch	hemlock	raspberry	willow
cedar	maple	rhododendron	witherod
cherry	pine	sheep laurel	

Annual Weed Control Prior to Crop Emergence or in Summerfallow

Weeds controlled	Weed stage	Formulations (active ingredient)	Rate per acre	Surfactant per acre
Green foxtail, lady's-thumb, stinkweed, volunteer barley, volunteer canola (non-glyphosate tolerant), volunteer wheat, wild mustard, wild oats	Up to 8 cm in height	Glyphosate (356 - 360 g/L)	0.31 L	0.14 L
		Glyphosate (450 g/L)	0.24 L	
		Glyphosate (480 g/L)	0.23 L	
		Glyphosate (500 g/L)	0.21 L	
		Glyphosate (540 g/L)	0.20 L	
All weeds listed above plus suppression of foxtail barley, flixweed and kochia	8 - 15 cm in height	Glyphosate (356 - 360 g/L)	0.41 L	0.14 L
		Glyphosate (450 g/L)	0.32 L	
		Glyphosate (480 g/L)	0.30 L	
		Glyphosate (500 g/L)	0.28 L	
		Glyphosate (540 g/L)	0.27 L	

Glyphosate (cont'd)

Weeds controlled	Weed stage	Formulations (active ingredient)	Rate per acre	Surfactant per acre
All weeds listed above plus downy brome, giant foxtail, Persian dandel, Canada fleabane, common ragweed, flaxweed, hemp-nettle, lamb's-quarters	Weeds up to 15 cm in height. For narrow-leaved hawk's-beard 8 - 15 cm or wild buckwheat (3 - 4 leaf stage) use high rate.	Glyphosate (356 - 360 g/L)	0.51 - 0.77 L	Surfactant is not required
		Glyphosate (450 g/L)	0.41 - 0.61 L	
		Glyphosate (480 g/L)	0.38 - 0.57 L	
		Glyphosate (500 g/L)	0.36 - 0.57 L	
		Glyphosate (540 g/L)	0.34 - 0.52 L	
All weeds listed above plus annual sow thistle, bluegrass, crabgrass, kochia, prickly lettuce, shepherd's purse, and narrow-leaved vetch	Up to 15 cm in height	Glyphosate (356 - 360 g/L)	0.91 L	Surfactant is not required
		Glyphosate (450 g/L)	0.73 L	
		Glyphosate (480 g/L)	0.68 L	
		Glyphosate (500 g/L)	0.65 L	
		Glyphosate (540 g/L)	0.61 L	
All annual grasses and broadleaved weeds listed above	Greater than 15 cm in height	Glyphosate (356 - 360 g/L)	1.42 L	Surfactant is not required
		Glyphosate (450 g/L)	1.13 L	
		Glyphosate (480 g/L)	1.07 L	
		Glyphosate (500 g/L)	1.0 L	
		Glyphosate (540 g/L)	0.94 L	

Tank Mixes in Minimum and Zero Tillage Systems Cropping Systems - Prior to seeding

Not all glyphosate products are registered for all tank mixes below. Refer to individual glyphosate for registered tank mixes, glyphosate rates and registered crop species labels.

Spring wheat, winter wheat, barley and rye:

- Glyphosate + 2,4-D (0.23 - 0.34 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 4 -leaf stage)
- Glyphosate + 2,4-D (0.45 - 0.68 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 6 -leaf stage)
- Glyphosate + Buctril M (0.2 - 0.4 L), Logic M (0.25 - 0.5 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 4 -leaf stage)
- Glyphosate + Banvel II (0.12 L) for broad-spectrum weed control, excluding volunteer glyphosate tolerant canola
- Glyphosate + Express TNG (4 grams/acre) + Agral 90 (0.35% v/v) for broad-spectrum weed control. This tank mixture will not control glyphosate tolerant canola
- Glyphosate + Pardner (0.51 L/acre), Brotex (0.6 L/acre): for broad-spectrum weed control

Field corn, sweet corn and flax:

- Glyphosate + MCPA (0.28 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 4 -leaf stage)
- Glyphosate + Buctril M (0.2 - 0.4 L/acre), Logic M (0.25 - 0.5 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 4 -leaf stage)

Field corn only:

- Glyphosate + Banvel II (0.12 L) for broad-spectrum weed control, excluding volunteer glyphosate tolerant canola

Field peas, lentils, and chickpeas:

- Glyphosate + MCPA amine (0.2 - 0.28 L/acre) for broad-spectrum weed control, including glyphosate tolerant canola. Note: use only amine formulations prior to seeding peas, lentils and chickpeas.

Canaryseed and seedling forage grasses (bromegrass, crested wheatgrass, intermediate wheatgrass, slender wheatgrass, tall wheatgrass, Russian wildrye, timothy, orchard grass, creeping red fescue, meadow fescue, meadow foxtail, tall fescue, meadow bromegrass, streambank wheatgrass, and reed canarygrass)

- Glyphosate + Buctril M (0.2 - 0.4 L), Logic M (0.25 - 0.5 L/acre) for broad-spectrum weed control, including control of volunteer Roundup Ready canola (up to 4 -leaf stage)

Tank Mixes in Minimum and Zero Tillage Systems Cropping Systems - Chem fallow

- Glyphosate + 2,4-D (0.5 L/acre)

- Glyphosate + Banvel II (0.12 L/acre)
- Glyphosate + Express TNG (4 grams/acre)
- Glyphosate + Pardner (0.51 L/acre), Brotex (0.6 L/acre)

Quackgrass Control Prior to Seeding or after Harvest in Annual and Forage Cropping Systems

Apply to actively growing quackgrass. Reduced control may result if rhizomes become dormant. This may occur when soil fertility is poor or land has not been tilled for several years.

Application on forages should be followed by tillage and should be made when good growing conditions exist.

	Weed stage	Formulation (active ingredient)	Rate per acre	Remarks
Quackgrass control: season long control on light to moderate infestation	3 - 4 green leaves. On fall tilled ground, delay the application until majority of quackgrass has 4 - 5 leaves	Glyphosate (356 - 360 g/L)	1.0 L	Allow 3 or more days after treatment before tillage. Fall treatment should be applied 3 - 4 weeks after swathing to actively growing quackgrass. Do not apply after first damaging frost in the fall. Frost of - 5°C is usually tolerated by new shoots. Frost damage is evident by drying of new shoots shortly after frost.
		Glyphosate (450 g/L)	0.81 L	
		Glyphosate (480 g/L)	0.76 L	
		Glyphosate (500 g/L)	0.73 L	
		Glyphosate (540 g/L)	0.67 L	
Quackgrass control: heavy infestations or sod bound quackgrass	3 - 4 green leaves or more	Glyphosate (356 - 360 g/L)	1.0 - 2.8 L	Use higher rate for sod bound quackgrass (left undisturbed for at least 2 years). Allow 3 or more days after treatment before tillage. Fall treatment should be applied 3 - 4 weeks after swathing to actively growing quackgrass. Do not apply after first damaging frost in the fall. Frost of - 5°C is usually tolerated by new shoots.
		Glyphosate (450 g/L)	0.81 - 2.43 L	
		Glyphosate (480 g/L)	0.76 - 2.28 L	
		Glyphosate (500 g/L)	0.71 - 2.13	
		Glyphosate (540 g/L)	0.67 - 2.01	

Canada Thistle Control: Summerfallow and Post Harvest

	Weed stage	Formulation (active ingredient)	Rate per acre	Remarks
Control of Canada thistle at the rosette stage (summerfallow)	Rosettes at least 15 cm in diameter	Glyphosate (356 - 360 g/L)	1.0 L	Conduct summerfallow tillage as usual and perform the last tillage operation between July 15 and August 1. Allow thistle to re-grow for a minimum of 5 weeks until they are 15 cm in diameter and majority of them are in a rosette stage. Allow 10 or more days after treatment before tillage. Treatment after a mild frost is possible provided leaves are green and plants are actively growing.
		Glyphosate (450 g/L)	0.81 L	
		Glyphosate (480 g/L)	0.76 L	
		Glyphosate (500 g/L)	0.73 L	
		Glyphosate (540 g/L)	0.67 L	
Control of Canada thistle: post-harvest stubble treatment	Bud stage or beyond	Glyphosate (356 - 360 g/L)	1.8 - 2.8 L	Allow 20 to 25 cm of new growth before application. Thistles must be sprayed at least 2 weeks prior to killing frost. Straw should be removed or evenly spread to allow for proper regrowth and spray coverage. Heavy frost prior to treatment may decrease control. Allow 5 or more days after treatment before tillage.
		Glyphosate (450 g/L)	1.62 - 2.3 L	
		Glyphosate (480 g/L)	1.44 - 2.13 L	
		Glyphosate (500 g/L)	1.38 - 2.02 L	
		Glyphosate (540 g/L)	1.28 - 1.89 L	

Tank Mixes: Canada Thistle Control

- Glyphosate + Banvel II (0.12 L/acre)

Dandelion Control: Prior to Seeding or After Harvest

For best results, apply up to and including dandelion bloom.

Glyphosate (cont'd)

Dandelion stage of growth		Formulation (active ingredient)	Remarks
Less than 15 cm rosettes	Greater than 15 cm rosettes		
1.0 L/acre	1.5 - 2.0 L/acre	Glyphosate (356 - 360 g/L)	Allow 3 or more days after treatment before tillage for all rates. Use the higher rate when infestations are heavy.
0.8 L/acre	1.21 - 1.61 L/acre	Glyphosate (450 g/L)	
0.76 L/acre	1.13 - 1.5 L/acre	Glyphosate (480 g/L)	
0.73 L/acre	1.09 - 1.46 L/acre	Glyphosate (500 g/L)	
0.67 L/acre	1.0 - 1.34 L/acre	Glyphosate (540 g/L)	

Alfalfa Control (Fall Treatment)

Staging	Formulation (active ingredient)	Rate per acre	Remarks
Early bud to full bloom (fall application only)	Glyphosate (356 - 360 g/L)	1.5 - 2.0 L	Use high rate when alfalfa populations are high or when grass infestation is heavy. Allow at least 5 days before tillage. Apply in 23 - 135 L/acre water.
	Glyphosate (480 g/L)	1.13 - 1.52 L	
	Glyphosate (500 g/L)	1.09 - 1.46 L	
	Glyphosate (540 g/L)	1.0 - 1.33 L	

Tank Mixes for Alfalfa Control (Fall and Spring)

The addition of 2,4-D may improve alfalfa control in situations where control may be more difficult to obtain, such as in minimum tillage systems where populations are heavy and with spring applications.

Tank mixture name	Rate per acre	Remarks
Glyphosate (356 - 360 g/L) + 2,4-D	Glyphosate: 1.0 - 2.0 L + 2,4-D: 0.49 - 0.97 L	For spring applications, use only the low rate of 2,4-D (i.e., 0.49 L/acre) and recommended rate of glyphosate. Only cereal crops not underseeded to legumes may be planted following spring applications of this tank mix, and a 14-day interval between application and planting is required.
Glyphosate (450 g/L) + 2,4-D	Glyphosate: 0.81 - 1.61 L + 2,4-D: 0.49 - 0.97 L	
Glyphosate (480 g/L) + 2,4-D	Glyphosate: 0.76 - 1.52 L + 2,4-D: 0.49 - 0.97 L	
Glyphosate (500 g/L) + 2,4-D	Glyphosate: 0.73 - 1.46 L + 2,4-D: 0.49 - 0.97 L	
Glyphosate (540 g/L) + 2,4-D	Glyphosate: 0.67 - 1.35 L + 2,4-D: 0.49 - 0.97 L	

Spot treatment (in-crop) of perennial weeds in wheat, oat, barley, corn, soybean forage legumes and forage grasses: Glyphosate may be applied for the control of Canada thistle, quackgrass and other perennial weeds (absinthe, blue grass spp., smooth brome grass, cattail, curled dock, field bindweed (bloom stage or beyond), hemp dogbane, hoary cress, poison ivy, purple loosestrife, perennial sow-thistle, and yellow nutsedge in forage crops, barley, wheat, oats, soybeans and legumes, including seed production. Treatments may be made up to heading of small grain, initial pod set on soybeans and legumes, silking of corn, and emergence of seed heads. The crop in the treated area will be killed. Avoid drift beyond the treated area. Application can be made using a boom sprayer, knapsack, or high volume equipment. Applications should be made using the same rates and at the same growth stages as listed in the quackgrass, Canada thistle and other perennial weed control tables.

Other Perennial Weed Control in Summerfallow, Shelterbelts and Post-harvest

Weeds controlled	Weed stage	Formulation (active ingredient)	Rate per acre	Remarks
Common milkweed	Bud to full bloom	Glyphosate (356 - 360 g/L)	4.9 L	Allow 7 or more days after treatment before tillage. Reduced control may occur after full bloom. Milkweed may not all be in the correct stage, therefore, repeat treatments may be required
		Glyphosate (450 g/L)	3.9 L	
		Glyphosate (480 g/L)	3.64 L	
		Glyphosate (500 g/L)	3.47 L	
		Glyphosate (540 g/L)	3.24 L	

Weeds controlled	Weed stage	Formulation (active ingredient)	Rate per acre	Remarks
Field bindweed	Full bloom or beyond	Glyphosate (356 - 360 g/L)	2.8 - 4.8 L	Allow 7 or more days after treatment before tillage.
		Glyphosate (450 g/L)	2.27 - 3.88 L	
		Glyphosate (480 g/L)	2.12 - 3.64 L	
		Glyphosate (500 g/L)	2.02 - 3.48 L	
		Glyphosate (540 g/L)	1.88 - 3.21 L	
Foxtail barley	Seedling to heading	Glyphosate (356 - 360 g/L)	1.0 - 2.0 L	Allow a minimum of 1 day after treatment before tillage or seeding. Use higher rates for larger, more established plants, heavy infestations or if plants are stressed.
		Glyphosate (450 g/L)	0.81 - 1.62 L	
		Glyphosate (480 g/L)	0.76 - 1.5 L	
		Glyphosate (540 g/L)	0.67 - 1.34 L	
Toadflax rosette stage (summerfallow)	Rosettes at least 15 cm tall or across.	Glyphosate (356 - 360 g/L)	1.0 L	Allow 7 or more days after treatment before tillage in summerfallow.
		Glyphosate (450 g/L)	0.81 L	
		Glyphosate (480 g/L)	0.76 L	
		Glyphosate (540 g/L)	0.67 L	
Alfalfa	Early bud to full bloom stage. Fall applications only.	Glyphosate (356 - 360 g/L)	1.5 - 2.0 L/acre	Allow 5 or more days after treatment before tillage. Use the higher rates when alfalfa populations are high or when heavy grass infestations are also present.
		Glyphosate (480 g/L)	1.13 - 1.52 L/acre	
		Glyphosate (500 g/L)	1.09 - 1.46 L	
		Glyphosate (540 g/L)	1.0 - 1.34 L	

Pre-harvest Perennial Weed Control

Crop: Wheat, barley (including malting barley*), oats*, canola (rapeseed), dry beans, flax (including solin), lentils, mustard (Weathermax only), peas, soybeans and forages.

Weeds Controlled: Quackgrass, Canada thistle, common milkweed, toadflax, dandelion, perennial sow-thistle (season long)

Rate

Formulation (active ingredient)	Crops		
	Wheat, barley (including malting barley*), oats*, canola (rapeseed), dry beans, flax (including solin), lentils, peas, soybeans	Chickpeas**, lupin**, fababeans**, mustard**	Forages
Glyphosate (356 - 360 g/L)	1 L/acre	Not registered	1 - 2 L/acre
Glyphosate (450 g/L)	0.8 L/acre	Not registered	0.8 - 1.6 L/acre
Glyphosate (480 g/L)	0.76 L/acre	Not registered	0.76 - 1.52 L/acre
Glyphosate (500 g/L)	0.73 L/acre	Not registered	0.73 - 1.46 L/acre
Glyphosate (540 g/L)	0.67 L/acre	0.67 L/acre	0.67 - 1.34 L/acre

Caution: Do not apply to any crops if grown for seed.

*Barley grown for malt and tame oat grown for milling are registered for the pre-harvest application. However, growers should contact malt barley and milling oat buyers prior to application to confirm acceptance of glyphosate treated grain

** These crops are registered with R/T 540, Roundup Transorb HC, Roundup WeatherMax and Roundup Ultra 2 only under *User Requested Minor Use Label Expansion program*. The manufacturer assumes no responsibility with respect to performance and/or crop tolerance claims for herbicide performance.

How to Apply

Ground (all products). Aerial: Do not apply by air, except Glyphos, Shooter Plus, Factor 540, Roundup Transorb HC, Roundup WeatherMax, Roundup Ultra 2, RT/540, ClearOut 41Plus, MPower Glyphosate.

Glyphosate (cont'd)

Crop Staging: Apply when average seed moisture is at or below 30%. Accurate measurement of seed moisture must be made before application. The following chart lists visual symptoms that can be used as guidelines as to when 30% grain moisture has been reached.

Crop*	Percent seed moisture	Visual symptoms
Wheat, barley, oat	Less than 30	Hard dough stage - a thumbnail impression remains on seed.
Canola (including glyphosate tolerant varieties)		Pods are green to yellow; most seeds are yellow to brown.
Flax (including low-linoleic acid varieties)		Majority (75%-80%) of bolls are brown.
Forage	Not applicable	Forage 3 to 7 days prior to the last cut before rotation or forage renovation. Do not apply to forage stands that are to be maintained.
Peas	Less than 30	Majority (75%-80%) of pods are brown.
Lentils		Lowermost pods (bottom 15%) are brown and seeds rattle.
Dry beans		Stems are green to brown in colour; pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves).
Soybeans (including glyphosate tolerant varieties)		Stems are green to brown in colour; pod tissue is dry and brown in appearance; 80%-90% leaf drop.
Chickpea		Stems are green to brown in colour; pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves)
Lupin		
Faba beans		

* Not all glyphosate products are registered for pre-harvest application on all crops species listed above. Refer to individual crop labels for registered uses and crop species.

Weeds Controlled and Staging

Quackgrass (4 - 5 green leaves), Canada thistle (at bud stage or beyond), common milkweed (bud to full bloom), toadflax (bud to full bloom), dandelions (rosette to full bloom), season-long control of perennial sow-thistle (at or beyond the bud stage), and most of the annual weeds which are green at the time of pre-harvest application.

Harvest Management Benefits

This treatment may also provide harvest management benefits by drying down crop and vegetative crop growth. Apply only during the period 7-14 days before harvest to ensure best weed control and to maximize harvest management benefits. Earlier application may reduce crop yield and/or quality and may lead to excess glyphosate residues in the crop. Extremely cool, wet and cloudy weather conditions between time of application and the anticipated harvest date may slow down activity of this product, thereby delaying crop dry down and harvest date.

Environmental Precautions

Over-spray or drift to important wildlife habitats such as bodies of water, wetlands (e.g., sloughs), shelterbelts, woodlots and other cover on the edges of fields frequented by wildlife, should be avoided.

Ground Application: Leave a 15-metre buffer zone between the last spray swath and the edge of any of these habitats. Do not expose or contaminate any body of water or non-target vegetation by direct application, spray drift, or when cleaning and rinsing spray equipment.

Aerial applications: maintain a 25 metre buffer zone from water and wetland areas, and 55 metre buffer from shelterbelts, woodlots, and other cover on the edge of treated fields

For Use in Glyphosate Tolerant Crops**Glyphosate Tolerant Canola**

Crop: Canola variety with Roundup ready gene. Always use pedigreed (certified) canola seed. Canola which is not designated as glyphosate tolerant will be damaged or destroyed by this treatment. Note: Not all glyphosate products are registered.

Crop Stage: Up to and including 6-leaf stage of glyphosate tolerant canola. Temporary yellowing may occur if applied at the 4 to 6 leaf stage of the crop.

With: Ground application only.

Water Volume: 40 - 90 L/acre.

Grazing and Cropping Restrictions: All portions of the treated crop may be fed to livestock.

Weeds controlled	Formulation (active ingredient)	Rate per acre
Single application		
Annual grasses: barnyard grass, green foxtail, volunteer barley, volunteer wheat, wild oats. Annual broadleaves: Stinkweed, redroot pigweed, wild mustard, Russian thistle, lamb's-quarters, non-glyphosate tolerant volunteer canola (rapeseed), hemp-nettle, lady's-thumb, kochia, chickweed, corn spurry, wild tomato, cleavers, wild buckwheat, shepherd's purse, cow cockle*, night-flowering catchfly*, smartweed*, stork's-bill, flaxweed, narrow-leaved hawk's beard, round-leaved mallow.	Glyphosate (356 - 360 g/L)	0.33 - 0.50 L
	Glyphosate (450 g/L)	0.27 - 0.40 L
	Glyphosate (480 g/L)	0.25 - 0.38 L
	Glyphosate (500 g/L)	0.24 - 0.57 L
	Glyphosate (540 g/L)	0.22 - 0.33 L
Perennial weed suppression: Canada thistle, dandelion, perennial sow-thistle, and season-long control of quackgrass.	Glyphosate (356 - 360 g/L)	0.50 L
	Glyphosate (450 g/L)	0.40 L
	Glyphosate (480 g/L)	0.38 L
	Glyphosate (500 g/L)	0.36 L
	Glyphosate (540 g/L)	0.33 L
Double application (first application as above)		
Additional flushes of weeds listed above plus round-leaved mallow, Canada thistle, foxtail barley, dandelion, perennial sow thistle, quack grass (season-long control).	Glyphosate (356 - 360 g/L)	0.50 L
	Glyphosate (450 g/L)	0.40 L
	Glyphosate (480 g/L)	0.38 L
	Glyphosate (500 g/L)	0.36 L
	Glyphosate (540 g/L)	0.33 L
Single application for perennial weed control		
All the weeds in single application listed above plus season-long control of Canada thistle and perennial sow-thistle.	Glyphosate (356 - 360 g/L)	0.75 L
	Glyphosate (450 g/L)	0.60 L
	Glyphosate (480 g/L)	0.56 L
	Glyphosate (500 g/L)	0.55 L
	Glyphosate (540 g/L)	0.51 L

*The lower rate can be used for control of shepherd's purse, cow cockle and night-flowering catchfly at the 1- 3-leaf stage of the crop or for control of smartweed at the 4- 6-leaf stage.

Note: A maximum of 1.0 L/acre of Glyphos, Sharpshooter Plus, and Touchdown iQ, 0.76 L/acre of Maverick III and Vantage Plus and 0.67 L/acre of Factor 540, Roundup Transorb HC, Roundup Weather Max, Roundup Ultra 2, R/T 540 per season is allowed in glyphosate tolerant canola.

Tank Mixes in Glyphosate Tolerant Canola

For season long control of top growth of Canada thistle and control of wild buckwheat in glyphosate tolerant canola.

Tank mixture name	Rate per acre	Remarks
Glyphosate (356 - 360 g/L) + Lontrel 360	Glyphosate: 0.5 L + Lontrel: 113 mL	Apply in 40 L of water per acre. Apply when canola is in the 2 - 6 leaf stage.
Glyphosate (450 g/L) + Lontrel 360	Glyphosate: 0.4 L + Lontrel: 113 mL	
Glyphosate (480 g/L) + Lontrel 360	Glyphosate: 0.38 L + Lontrel: 113 mL	
Glyphosate (500 g/L) + Lontrel 360	Glyphosate: 0.36 - 1.46 L/acre + Lontrel: 113 mL	
Glyphosate (540 g/L) + Lontrel 360	Glyphosate: 0.33 - 1.35 L/acre + Lontrel: 113 mL	

Glyphosate (cont'd)**Glyphosate tolerant corn**

Crop: Corn with Roundup ready gene. Always use pedigreed (certified) corn seed. Corn that is not designated as glyphosate tolerant will be damaged or destroyed by this treatment.

Crop Stage: Up to and including 8-leaf stage of glyphosate tolerant corn.

How to Apply: Ground application only. **Do not apply by air.**

Water Volume: 40 - 90 L/acre.

Formulation (active ingredient)	Rate per acre	Weeds controlled
Glyphosate (356 - 360 g/L)	1.0 L	Annual grasses: barnyard grass, green foxtail, volunteer barley, volunteer wheat, wild oat. Annual broadleaves: chickweed, cleavers, corn spurry, cow cockle, flixweed, hemp-nettle, kochia, lady's-thumb, lamb's-quarters, narrow-leaved hawk'-beard, night-flowering catchfly, redroot pigweed, round leaved mallow*, Russian thistle, shepherd's-purse, smartweed, stinkweed, stork's-bill, volunteer canola (except glyphosate tolerant varieties), wild buckwheat, wild mustard, wild tomato.
Glyphosate (450 g/L)	0.76 L	
Glyphosate (480 g/L)	0.73 L	
Glyphosate (500 g/L)	0.80 L	
Glyphosate (540 g/L)	0.67 L	
A second (sequential) application		
Glyphosate (356 - 360 g/L)	1.0 L	Late flushes of heavy infestations of the above weeds plus control of common milkweed, field bindweed, round-leaved mallow, yellow nutsedge.
Glyphosate (450 g/L)	0.80 L	
Glyphosate (480 g/L)	0.76 L	
Glyphosate (500 g/L)	0.73 L	
Glyphosate (540 g/L)	0.67 L	

A single application of 1.34 L/ac (540 g/L) is also registered but can only be applied up to the 6 leaf stage of RR Corn.

Note: Weeds will be more easily controlled and early crop competition avoided with applications made when the weeds are small. Control of weeds greater than 25 cm in height will be inconsistent, although some weeds may be controlled.

Weed Control in Non-cropland Areas

Weed	Formulation (active ingredient)	Rate per acre	Hand held high volume application % solution	Remarks
Annual grasses and broadleaves	Glyphosate (356 - 360 g/L)	0.91 - 1.21 L	0.67 %	Apply to actively growing weeds. Water volume: 20 - 40 L/acre.
	Glyphosate (480 g/L)	0.68 - 1.1 L		
	Glyphosate (540 g/L)	0.6 - 0.94 L		
Quackgrass	Glyphosate (356 - 360 g/L)	1.91 - 2.82 L	1.34%	20 - 120 L/acre of water volume. Add 0.5% v/v of a recommended surfactant when using water volumes greater than 60 L/acre. Higher rate for long term control and for heavy infestations.
	Glyphosate (480 g/L)	1.44 - 2.12 L		
	Glyphosate (540 g/L)	1.28 - 1.84 L		
Canada thistle (bud stage)	Glyphosate (356 - 360 g/L)	1.91 - 2.82 L	1.34 %	20 - 120 L/acre of water volume. Add 0.5% v/v of a recommended surfactant when using water volumes greater than 60 L/acre. Higher rate for long term control and for heavy infestations.
	Glyphosate (480 g/L)	1.44 - 2.12 L		
	Glyphosate (540 g/L)	1.28 - 1.84 L		
Purple loosestrife	Glyphosate (356 - 360 g/L)	2.42 L	0.67 - 1.34%. Use 22% solution for wiper application	
	Glyphosate (450 g/L)	1.94 L		
	Glyphosate (480 g/L)	1.81 L		
	Glyphosate (540 g/L)	1.61 L		

Weed	Formulation (active ingredient)	Rate per acre	Hand held high volume application % solution	Remarks
Other perennials	Glyphosate (356 - 360 g/L)	2.82 - 4.84 L	1.34 %	Water volume: 40 - 120 L/acre. Add 0.5% v/v of a recommended surfactant when using water volumes greater than 60 L/acre. Higher rate for long term control and for heavy infestations.
	Glyphosate (480 g/L)	2.12 - 3.63 L		
	Glyphosate (540 g/L)	1.89 - 3.23 L		
Brush and trees: birch, cherry, poplar, western snow berry, willow	Glyphosate (356 - 360 g/L)	1.21 - 2.42 L	0.67 - 1.34 %	Water volume: 40 - 120 L/acre. Timing: Summer through early fall
	Glyphosate (450 g/L)	0.97 - 1.94 L		
	Glyphosate (480 g/L)	0.91 - 1.81 L		
	Glyphosate (540 g/L)	0.8 - 1.6 L		
Alder, maple, raspberry, salmonberry	Glyphosate (356 - 360 g/L)	2.42 L	1.34 %	Water volume: 40 - 120 L/acre. Timing: Late summer through early fall.
	Glyphosate (450 g/L)	1.94 L		
	Glyphosate (480 g/L)	1.81 L		
	Glyphosate (540 g/L)	1.61 L		
Turf renovation	Glyphosate (356 - 360 g/L)	1.0 - 4.85 L	0.67 - 1.34 %	Water volume: 40 - 120 L/acre. Use higher end of the rate range for perennials.
	Glyphosate (450 g/L)	0.8 - 3.9 L		
	Glyphosate (480 g/L)	0.76 - 3.64 L		
	Glyphosate (540 g/L)	0.67 - 3.2 L		

Tank Mixes for Non-crop and Industrial Areas - Residual Control

Tank mixture name	Rate per acre	Remarks
Glyphosate (356 - 360 g/L) + Simazine	Glyphosate: 1.0 - 4.85 L Simazine: 1.61 - 3.63 L	The simazine component of this tank mixture will provide season long control of most germinating broadleaf weeds and grasses. Water volume: 80 - 160 L/acre. Do not apply to coarse, sandy or gravelly soil. One application per year.
Glyphosate (480 g/L) + Simazine	Glyphosate: 0.75 - 3.63 L Simazine: 1.61 - 3.63 L	
Glyphosate (540 g/L) + Simazine	Glyphosate: 0.67 - 3.23 L Simazine: 1.61 - 3.63 L	

Additional Application Information

Water Volume: Handgun (high water volume): 80 - 120 L/ac. Boom: 23 - 45 L per acre in most situations; use of the lower volume may improve control when hard water (Ca or Mg) or iron (Fe) ions are present.

Chemical fallow: 20 - 40 L/ac.

Application Tips

Tillage or mowing prior to application will reduce effectiveness on perennial weeds. Minimum days to wait before tillage after application: annual weeds: 1 day; spring and fall quackgrass: 3 days; Canada thistle bud stage: 5 days; fall rosette stage: 7 - 10 days; field bindweed, milkweed and other perennials: 7 days. Best results are obtained when temperatures are near 20° C and when weeds are actively growing. Control will be reduced if foliage is heavily covered with dust. Hard water or water containing calcium (Ca), Magnesium (Mg) and iron (Fe) ions will reduce the activity of glyphosate. Dirty water or water with suspended soil or organic matter will reduce control.

How it Works

A non-selective, systemic herbicide that moves from the foliage into roots and kills the entire plant.

Expected Results

Wilting and yellowing of annual weed occurs within 2 - 4 days; perennial requires 7 - 10 days. Complete browning of above ground growth and deterioration of roots occurs. Cool, cloudy conditions may slow activity.

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage and a repeat treatment

Glyphosate (cont'd)

may be required. Do not apply if rainfall is forecast for the time of application. **Note. Roundup Transorb HC, Roundup WeatherMax, Roundup Ultra 2, and R/T 540:** Rainfall occurring within 60 minutes of treatment may result in reduced weed control.

Movement in the Soil: Negligible leaching.

Grazing Restrictions: Do not graze or harvest treated areas until plants have turned brown and started to deteriorate.

Re-cropping Intervals: No restrictions.

Environmental Precautions

Avoid direct application to any body of water populated with fish or used for domestic purposes. Do not use in areas where adverse impact on domestic water or aquatic species is likely. Do not contaminate water by disposal of waste or cleaning of equipment. Avoid all drift or contact with vegetation for which treatment is not intended as damage or destruction may occur. Overspray or drift to important wildlife habitats such as bodies of water, wetlands (e.g., sloughs), shelterbelts, woodlots and other cover on the edges of fields frequented by wildlife, should be avoided. Observe following buffer zone guidelines: **Ground Applications:** Leave a 15 metre buffer zone between the last spray swath and the edge of the spray boom to non-target areas to minimize drift damage.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ = 4,320 mg/kg. Eye irritant, non-toxic to bees, birds and fish.

Storage

Heated storage is not required. May be stored below 0° C.

Gramoxone

Danger Poison

Group 22

Formulations

Product	Company	Active ingredient	Formulation	Container size
Gramoxone (PCP # 8661)	Syngenta Crop Protection	Paraquat: 200 g/L	Solution	1, 4 x5 L pack

Crops, Weeds Controlled, Rates and Staging

Pre or post seeding weed burndown for annual and perennial weeds.

Annual grasses and broadleaf weeds: seedlings.

Perennial weeds, including quackgrass: growth stage is not specified on the label.

Crop	Rate	Timing and specific comments
Barley, canaryseed, corn (field, sweet), dry common beans, field peas, flax, lentils, mustard, oats, potatoes, rye, soybeans, sunflower, triticale, wheat	0.8 - 1.6 L/acre	Apply before or after seeding, but prior to crop emergence to emerged weeds. For control of winter annual weeds, or when weed growth is dense and weeds are greater than 10 cm in height, use at least 1.21 L per acre and higher volumes of water. Apply with a minimum of 40 L of water/acre.
Potatoes	1.11 - 2.22 L/acre	For Idaho Baker, Russett or Burbank and Cherokee, apply up to ground crack only (potato tops about to emerge). For other varieties, apply up to time first potato tops have reached 5 to 8 cm in height. Apply in 120 - 220 L/acre of spray solution
Established alfalfa and bird's-foot trefoil in hay and pasture		Spray no later than 5 days after first cutting in early June. Apply in 120 - 220 L/acre of spray solution.
Shelterbelts	2.22 L/acre	Apply as directed spray. Avoid contact with foliage and plant parts. Apply in 445 L of water/acre or 75 mL in 10 L of water/100 m ² . 550 mL of this mixture will treat an area 1.75 metres diameter around a tree. Keep chemical off the tree foliage.

Tank Mixes

Tank-mix partner	Gramoxone plus tank mix partner rate	Additional weeds controlled
In potatoes		
Lorox	Gramoxone @1.11 - 2.22 L/acre + Lorox @ 0.91 - 1.81 L/acre	Residual control of annual grasses and broadleaf weeds.
Sencor 500	Gramoxone @1.11 - 2.22 L/acre + Sencor @ 0.45 - 0.71 L/acre	
In corn		
Aatrex	Gramoxone @1.11 - 2.22 L/acre + Aatrex @ 0.85 - 1.25 L/acre	
Dual II Magnum	Gramoxone @1.11 - 2.22 L/acre + Dual II Magnum @ 0.50 - 0.71 L/acre	

Application Information

Apply with ground sprayers only. Do not apply by air.

Water volume: 120 - 445 L/ac. For dense weed growth, use the greater volume of water.

Application Tips

Use only clean water to avoid reduction in effectiveness. Use high volume, low pressure type spraying equipment to thoroughly cover foliage. Special equipment is necessary to shield some row crops from spray. Applications on cloudy days or just prior to or during periods of darkness will generally increase the treatment effectiveness. Wash equipment thoroughly after spraying - use a wetting agent (Agral 90 at 60 mL/100 L of water).

How it Works

Gramoxone is a contact type herbicide; therefore, good spray coverage is essential. It is absorbed by all leaf and stem surfaces and is non-systemic. It interferes with photosynthesis.

Expected Results

Provides immediate, fast and virtually complete annual weed kill from 1 application. Repeat applications may be necessary for perennial weeds. Yellowing occurs within a few hours and desiccation of the plant continues rapidly until death.

Restrictions

Rainfall: Rain prior to spray solution drying on plant will reduce effectiveness of the chemical. Once spray solution has dried on plant tissue, rain will not reduce effectiveness.

Grazing: Pre-seed burndown in cereals, oilseed and pulse crops: Do not graze or harvest crops within 30 days of treatment.

Re-cropping: No restriction.

Environmental Precautions

This product is toxic to aquatic organisms and terrestrial plants. Observe label buffer zones around aquatic areas and susceptible terrestrial areas. Do not apply this product directly to aquatic areas.

Runoff: To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Drift: Avoid overspray or drift onto crops, ornamental plants, lawns, grazing areas and other sensitive areas.

Toxicity

Moderate acute oral LD₅₀ (rats) = 612 mg/kg body weight.

Caution: Symptoms of acute poisoning may occur. Intake can cause heart, liver and kidney damage and can be fatal. It can be absorbed through the skin.

Storage

Store above 0 °C. If crystallization occurs because of storage below 0 °C, warm to room temperature and agitate until reconstituted.

Grazon



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Grazon (PCP # 26649)	Dow AgroSciences	Picloram: 65 g/L + 2,4-D: 240 g/L	Emulsifiable concentrate	2 x 10 L, 110 L

Crops and Staging

Permanent grass pasture and rangeland. Apply in spring or early summer after first growth appears.

Weeds, Staging and Rates

Weeds controlled at 1.5 L/acre (season-long control only)

Canada thistle	dandelion	yarrow
----------------	-----------	--------

Weeds controlled at 2.8 L/acre

burdock	plantain	vetch,
common ragweed	prickly lettuce	wild carrot
fleabane	red clover	
goldenrod	sweet clover	

Woody species control at 7.3 - 10.1 L. Apply following full leaf development and during periods of active growth

alder	maple	spruce
birch	pine	for other woody species, contact manufacturer for
cedar	poplar species	more information and recommendations

Tank Mixes

None registered.

Application Information

Apply with ground sprayers or by aircraft using a drift control system. Water volume: Ground: 80 L/acre.

Air: 60 - 80 L/acre.

Application Tips

Apply in spring or early summer after weeds have fully emerged and when weeds are growing rapidly. Ensure that there is adequate coverage of target weeds. Broadleaf crops are extremely sensitive to Grazon, and care should be taken to prevent drift onto sensitive crops. Use appropriate drift control measures to prevent Grazon from affecting sensitive, non-target vegetation. Do not apply on soils that are very permeable (sandy loam to sand) through the entire profile and that have an underlying shallow aquifer.

How it Works

Interferes with cell division, causing leaf cupping, stem distortion and eventual death of plant. Grazon is absorbed through leaves and roots.

Expected Results

Perennial weeds show distorted stems and cupped leaves, which turn yellow and then brown. Usually native grass increases in abundance as a result of reduced competition. Poor results may be expected if weeds are not actively growing in late summer or due to drought or frost.

Restrictions

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage, resulting in reduced weed control. Do not apply if rainfall is forecast for the time of application.

Grazing: Do not allow lactating dairy animals to graze the treated areas within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Grazon (cont'd)

Pre-harvest Intervals: Do not harvest forage or cut hay within 30 days after application

Re-cropping: Legumes may not be established in a pasture for several years after a Grazon treatment. **If legumes are essential in a pasture, do not use Grazon.** Do not break up treated pasture and plant to sensitive broadleaf crops for at least 5 years after application of Grazon. Do not move cut forage or manure from treated areas to areas that may be seeded to a sensitive crop.

Environmental Precautions

Grazon is slightly toxic to aquatic organisms, including fish. Do not apply directly to any body of water. Grazon is highly mobile in the soil and water. Do not allow runoff or spray to contaminate wells, irrigation ditches or any body of water used for irrigation or domestic purposes.

Drift: Most broadleaved plants are very sensitive to picloram. Care should be taken to avoid spraying desirable broadleaved plants during both growing and dormant periods.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 2,598 mg/kg.

Storage

Store in a cool, dry place. Do not freeze. If freezing occurs, bring to room temperature and mix thoroughly.



Caution Poison

Harmony K

Group 1, 2, 4

Formulations

Harmony K is a prepackaged mixture of the following products:

Product	Company	Active ingredient	Formulation	Container size
DB 8454 (PCP# 28894)	E.I. duPont Canada	Thifensulfuron-methyl: 8% + Tribenuron methyl: 4% + Dicamba: 54%	WSG	2.1 kg
Harmony Grass (PCP# 29299)		Clodinafop-propargyl: 128 g/L	EC	1 x 7.2 L

Crops and Staging

Crop	Stage
Spring wheat (including durum)	2 - 5 leaf stage

Weeds and Staging

Apply to young, actively growing broadleaf weeds, less than 10 cm tall or across, unless otherwise stated.

Grassy weeds

barnyard grass (1 - 5 leaf, before 3- tillers)
green foxtail (1 - 5 leaf, before 3 tillers)
volunteer canaryseed (1 - 6-leaf, before 4-tillers)

volunteer oats (1 - 6 leaf, before 4-tillers)
wild oats (1 - 6-leaf, before 4 tillers)
yellow foxtail (1 - 5 leaf, before 3- tillers)

Broadleaf weeds

ball mustard
Canada thistle (≥ 15 cm, but before budding)*
chickweed (1 - 6 leaf)
cleavers (1 - 3 whorl)*
common groundsel
corn spurry
cow cockle
dandelion**
flixweed
green smartweed
hemp-nettle
kochia (including group 2-resistant biotypes) (1 - 8 leaf)
lady's-thumb
lamb's-quarters
narrow-leaved hawk's-beard

redroot pigweed
round-leaved mallow (2-6 leaf)*
Russian thistle
scentless chamomile*
shepherd's-purse
sow-thistle (≤ 15 cm, before budding)*
stinkweed
stork's-bill (2 - 6 leaf)*

tartary buckwheat
toadflax (≤ 15 cm in height)*
volunteer canola
volunteer sunflower
wild buckwheat (1 - 5 leaf)
wild mustard

* Suppression ** Spring or fall rosettes, less than 15 cm in diameter

Harmony K (cont'd)**Tank Mixes**

None.

Rate

DB-8454: 52.6 g/acre. Harmony Grass: 177 mL/acre. One package treats 40 acres.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 40 L/ac.

Application Tips

Higher spray volumes are required for dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Effectiveness of Harmony K may be reduced if it remains in the tank for more than 24 hours. Do not use flood type nozzles, controlled droplet application equipment, spray foils or hollow cone nozzles. Do not apply to crop stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

How it Works

Harmony K is absorbed by the foliage and rapidly translocated to the growing points. Inhibits cell elongation in broadleaf weeds. Thorough coverage of the plants is essential for consistent control.

Expected Results

Broadleaf weed growth stops immediately. Discolouration of dying weeds may be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Grassy weeds - depending on the species, growing conditions and crop competition - leaves and growing points turn yellow within 1 - 3 weeks after application. Poor results may be expected if there is improper mixing, timing or coverage, or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 4 hours of application may lessen degree of weed control with Harmony K.

Grazing: Wheat may be grazed 7 days after the application of Harmony K.

Pre-harvest Interval: Do not harvest forage or cut hay within 60 days after application.

Re-cropping: Do not treat wheat underseeded to forages. Do not plant to any crop until 2 months after application. Do not exceed a total of 12 g/ac of Refine SG per crop year.

Toxicity

Acute oral LD₅₀ (rats) = 2,276 mg/kg.

Storage

Store product in closed, original container in a cool, dry, well ventilated room.

Harmony Max

Group 1, 2, 4

Formulations

Harmony Max is a prepackaged mixture of following products:

Product	Company	Active ingredient	Formulation	Container size
Harmony Broadleaf (PCP # 29116)	E.I. duPont Canada	Thifensulfuron-methyl: 33% + Tribenuron methyl: 16.6%	WSG	480 g bottle
Harmony Grass (PCP # 29299)		Clodinafop-propargyl: 128 g/L	EC	1 x 7.2 L
Perimeter (PCP # 29586)		Fluroxypyr: 180g/L	EC	1 x 4.9 L

Crops and Staging

Crop	Stage
Spring wheat (including durum)	2 leaf up to emergence of 4th tiller

Weeds and Staging

Apply to young, actively growing broadleaf weeds, less than 10 cm tall or across, unless otherwise stated.

Grassy weeds

barnyard grass (1 - 5 leaf, before 3- tillers)	volunteer canaryseed (1 - 6 leaf, before 4-tillers)	wild oats (1-6-leaf, before 4-tillers)	yellow foxtail (1 - 5 leaf, before 3- tillers)
green foxtail (1 - 5 leaf, before 3- tillers)	volunteer oats (1 - 6 leaf, before 4-tillers)		

Broadleaf weeds

ball mustard	flixweed	redroot pigweed	stork's-bill (2 - 6 leaf)*
Canada thistle (\geq 15 cm, but before budding)*	green smartweed	roundleaved mallow (2 - 6 leaf)*	tartary buckwheat
chickweed (1 - 6 leaf)	hemp-nettle	Russian thistle	toadflax (\leq 15 cm in height)*
cleavers (1 - 4 whorl)*	kochia (including Group 2-resistant biotypes)	scentless chamomile*	volunteer canola
common groundsel	lady's-thumb	shepherd's-purse	volunteer sunflower
corn spurry	lamb's-quarters	sow-thistle (\leq 15 cm, before budding)*	wild buckwheat (1 - 5 leaf)
cow cockle	narrow-leaved hawk's-beard	stinkweed	wild mustard

* Suppression

Tank Mixes

None.

Rate

Harmony Broadleaf: 12 g/acre. Harmony Grass: 177 mL/acre. Perimeter: 121 mL/acre. One package treats 40 acres. Surfactant not required.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 40 L/acre.

Application Tips

Higher spray volumes are required for dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Effectiveness of Harmony Max may be reduced if it remains in the tank for more than 24 hours. Do not use flood type nozzles, controlled droplet application equipment, spray foils or hollow cone nozzles. Do not apply to crop stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

Harmony Max (cont'd)**How it Works**

Harmony Max is absorbed by the foliage and rapidly translocated to the growing points. Inhibits cell elongation in broadleaf weeds. Thorough coverage of the plants is essential for consistent control.

Expected Results

Broadleaf weed growth stops immediately. Discolouration of dying weeds may be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Grassy weeds - depending on the species, growing conditions and crop competition - leaves and growing points turn yellow within 1 - 3 weeks after application. Poor results may be expected if there is improper mixing, timing or coverage, or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 1 hour of application may lessen degree of weed control with Harmony Max.

Grazing: Wheat may be grazed 7 days after the application of Harmony Max.

Pre-harvest Interval: Do not harvest forage or cut hay within 60 days after application.

Re-cropping: Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye or wheat or fields can be summerfallowed the year after treatment. Do not exceed a total of 12 g/ac of Harmony Broadleaf per crop year.

Toxicity

Acute oral LD₅₀ (rats) = 2,276 mg/kg.

Storage

Store in a cool, dry place. May be frozen. If frozen, bring to room temperature and agitate before use. This product is COMBUSTIBLE. DO NOT store near heat or open flame.



Caution Poison

Harmony SG

Group 1, 2

Formulations

Harmony SG is a prepackaged mixture of Refine SG and Horizon.

Product	Company	Active ingredient	Formulation	Container size
Refine SG (PCP # 28285)	E.I. duPont Canada	Thifensulfuron-methyl: 33% + Tribenuron methyl: 16.6%	WSG	486 g bottle
Harmony Grass (PCP # 29202)		Clodinafop-propargyl: 128 g/L	EC	1 x 7.2 L

Crops and Staging

Crop	Stage
Spring wheat (including durum)	2 - flag leaf stage

Weeds and Staging

Apply to young, actively growing broadleaf weeds that are less than 10 cm tall or across, unless otherwise noted below.

Grassy weeds

barnyard grass (1 - 5 leaf,
before 3- tillers)
green foxtail (1 - 5 leaf,
before 3 tillers)

volunteer canaryseed (1-6-leaf,
before 4-tillers)
volunteer oats (1-6-leaf, before
4-tillers)

wild oats (1 - 6-leaf, before
4 tillers)

Broadleaf weeds (less than 10 cm across or tall unless noted otherwise)

ball mustard	flixweed	scentless chamomile*	volunteer canola (excluding
Canada thistle (≥ 15 cm, but before budding)*	hemp-nettle	shepherd's-purse	clearfield canola)
chickweed (1 - 6 leaf)	kochia**	sow-thistle (≥ 15 cm, but before budding)	volunteer sunflower
cleavers (1 - 3 whorl) *	lady's thumb	stinkweed	wild buckwheat (up to the 5 - leaf stage)
common groundsel	lamb's-quarters	stork's-bill (2-6 leaf) *	wild mustard
corn spurry	narrow leaved hawk's-beard	tartary buckwheat	
cow cockle	redroot pigweed	toadflax (15 cm in height) *	
green smartweed	round-leaved mallow (2 - 6 leaf)*		
	Russian thistle		

* Suppression

** Most effective control with early application. Most kochia in Alberta has been found to be Group 2 resistant. Without testing to confirm, assume kochia in your field is resistant and will not be controlled by this product alone

Rate

Refine SG: 12 g/acre. Harmony Grass: 177 mL/acre. One package treats 40 acres.

Tank Mixes

Tank-mix partner	Harmony SG plus tank mix partner rate	Additional weeds controlled
In spring wheat (including durum)		
Banvel II	Refine SG @12 g/acre + Harmony Grass @ 177 mL/acre + Banvel II @ 60 mL/acre.	Group 2 resistant kochia
MCPA ester 500	Refine SG@ 12 g/acre + Harmony Grass @ 177 mL/acre + MCPA ester 500 @ 340 - 450 mL/acre.	Control of all types of volunteer canola, including CLEARFIELD and Roundup Ready varieties,

Application Information**With:** Ground and air equipment.**Water volume:** Ground: 22 L/ac (minimum). Air: 11 L/ac.**Application Tips**

Higher spray volumes are required for dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Effectiveness of Harmony SG may be reduced if it remains in the tank for more than 24 hours. Do not use flood type nozzles, controlled droplet application equipment, spray foils or hollow cone nozzles. Do not apply to crop stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

How it Works

Harmony SG is absorbed by the foliage and rapidly translocated to the growing points. Inhibits cell elongation in broadleaf weeds. Thorough coverage of the plants is essential for consistent control.

Expected Results

Broadleaf weed growth stops immediately. Discolouration of dying weeds may be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Grassy weeds - depending on the species, growing conditions and crop competition - leaves and growing points turn yellow within 1 - 3 weeks after application. Poor results may be expected if there is improper mixing, timing or coverage, or when weeds are under drought stress.

Restrictions**Rainfall:** Rainfall within 1 hour of application may reduce weed control with Harmony SG.**Grazing:** Wheat may be grazed 7 days after the application of Harmony K.**Pre-harvest Interval:** Do not harvest forage or cut hay within 60 days after application.**Re-cropping:** Do not treat wheat underseeded to forages. Do not plant to any crop until 2 months after application.**Toxicity**Acute oral LD₅₀ (rats) = 2,276 mg/kg.

Harmony SG (cont'd)**Storage**

Store product in closed, original container in a cool, dry, well ventilated room.

Heat

Group 14

Formulations

Product	Company	Active In-gredient	Formulation	Container size
HEAT (PCP# 29368)	BASF Canada	Saflufenacil	70% wettable granule	8 x 844 g jugs/case

1 jug treats 30 - 80 acres, 1 case treats 240 - 640 acres

Crops and Staging

Crop	Stage	Rate
Wheat (spring, winter, durum), barley, oats, canaryseed, corn (field, sweet), field peas, chickpeas	Pre-seed or pre-emerge	10.4 g/acre - 28.4 g/acre
Lentil*, soybean*		10.4 g/acre
Chamfallow		10.4 g/acre - 28.4 g/acre

Note: * Do not use rates higher than 10.4 g/acre or injury could result.

Weeds, Staging

Broad leaves: Apply up to the 8 leaf stage unless otherwise specified.

Broadleaf weeds controlled

kochia (<15 cm)	red root pigweed**	wild mustard**
Canada fleabane	round leaf mallow	flixweed*
cleavers (<4 whorl)	stinkweed**	dandelion* (top growth control < 15 cm)
lamb's quarters	volunteer canola (all types)	
narrow leaf hawk's beard (< 8cm)	wild buckwheat**	

* Rapid burndown when tank mixed with glyphosate.

** Applications at the 28.4 g/acre rate will also provide suppression of the emergence of these weeds.

Tank Mixes

HEAT should always be tank mixed with glyphosate 0.5 - 1 L/acre of 360 g/l equivalent.

Application Information:

How to Apply: Ground equipment only.

Water Volume: 20 - 40 L/acre. Use higher water volume (40 L/ac) when used for dense weed stands or larger weeds.

Application Tips

Good growing conditions promote weed growth and enhance the activity of HEAT WG. Weeds hardened off by cold weather or drought stress may not be controlled. Insufficient water volumes or coarse sprays may also reduce control levels.

How it Works

HEAT WG is rapidly absorbed by root and foliar uptake: once absorbed, it exhibits mobility in plants. HEAT WG is a potent inhibitor of protoporphyrinogen oxidase (PPO). Cell membrane damage induced by inhibition of PPO leads to plant death. Susceptible weeds develop injury symptoms within hours of application under active growing conditions; plant death occurs within 3 to 5 days depending on growing conditions.

Restrictions

Rainfall: Follow the glyphosate manufacturers recommendation for rainfall.

Grazing: Contact the manufacturer for information on grazing.

Pre-harvest Interval: Leave 60 days between application and harvest.

Re-cropping Restrictions: Registered crops may be reseeded if necessary in the event of crop failure. Lentil and soybean may be reseeded only if the 10.4 g/a rate was applied. Canola, dry beans, flax and mustard may be seeded the following year in addition to all registered crops without rate restrictions.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = > 2,000 mg/kg

Storage

Store in cool, dry place.

Horizon NG/NextStep/Foothills/ Legend/Signal/Ladder/MPower Aurora/Nufarm Clodinafop



Caution Poison

Group 1

Formulations

Product		Company	Active ingredient	Formulation	Container size
Horizon NG*	Horizon NG* (PCP # 29089)	Syngenta	Clodinafop-propargyl: 60g/L	Emulsifiable concentrate	2 x 7.57 L, 121 L, 424.4 L
NextStep NG*	NextStep (PCP # 29278)	Arysta LifeScience	Clodinafop-propargyl: 60g/L	Emulsifiable concentrate	1 x 3.68 L
Foothills	Foothills A (PCP # 29279)	Viterra	Clodinafop-propargyl: 240g/L	Emulsifiable concentrate	1 x 3.68 L
	Foothills B (PCP #29280)		Surfactant blend: 17%	Solution	2 x 6.4 L
Legend	Legend A (PCP# 29526)	Interprovincial Cooperative Limited	Clodinafop-propargyl: 240g/L	Emulsifiable concentration	1 x 3.68 L
	Legend B (PCP# 29527)		Surfactant blend: 17%		2 x 6.4 L
NextStep	NextStep (PCP # 29278)	Arysta LifeScience	Clodinafop-propargyl: 240g/L	Emulsifiable concentrate	1 x 3.68 L
	Steppe Adjuvant		Surfactant blend: 17%	Solution	2 x 6.4 L
Signal	Signal (PCP # 29172)	Nufarm Canada	Clodinafop-propargyl: 240g/L	Emulsifiable concentrate	1 x 3.68 L
	Signal Adjuvant or Enhance (PCP# 29952)		Surfactant blend: 17%	Solution	2 x 6.4 L
				Triglyceride ethoxylate 10 POE 80%	Emulsifiable concentrate
Ladder	Ladder 240 (PCP # 29495)	MANA Canada	Clodinafop-propargyl: 240g/L	Emulsifiable concentrate	1 x 3.68 L
	XA Oil		Surfactant blend: 17%	Solution	x 6.4 L
MPower Aurora	Aurora (PCP# 29711)	New Agco Inc	Clodinafop-propargyl: 240 g/L (requires a surfactant)	Emulsifiable concentrate	1 x 3.68 L
	MPower Chem Spray Adjuvant		Surfactant blend: 17%	Solution	2 x 6.4 L

* Adjuvant included in the formulation.

Horizon NG/NextStep/Foothills/Legend/Signal/Ladder/MPower Aurora/Nufarm Clodinafop (cont'd)

Crops and Staging

Crop	Stage
Spring wheat (including durum)	1 - 6 leaf stage prior to emergence of 4th tiller.

Weeds and Staging

Weed	Stage	Additional remarks
barnyard grass, persian damel	1 - 5 leaf stage on main stem	For optimum control, apply before tillering.
green foxtail yellow foxtail	1 - 5 leaf stage on main stem	For optimum control, apply prior to emergence of the 3rd tiller.
volunteer canary seed wild oats	1 - 6 leaf stage on main stem	Prior to emergence of 4 th tiller.
volunteer oats	3 - 6 leaf stage on main stem	

Weeds Controlled

Product	Rate per acre		Weeds controlled
	Herbicide	Adjuvant	
Horizon NG [*] NextStep NG [*]	376 mL	Do not add Score adjuvant.	Barnyard grass, green foxtail, volunteer canary seed, volunteer oats, wild oats
	473 mL		Above weeds plus Persian damel
Legend, Foothills, Signal, Ladder, MPower Aurora, Nufarm clodinafop	95 mL	Adjuvant: 0.8 % v/v	Barnyard grass, green foxtail, volunteer canary seed, volunteer oats, wild oats
	115 mL	Adjuvant: 1.0 % v/v	Persian damel plus above weeds

* Horizon NG and NextStep NG contain a built in adjuvant system. Do not add Score adjuvant to either Horizon NG or NextStep NG.

Tank Mixes

Note: Not all products are registered for all tank mixes. Check label for tank mix partners.

Tank-mix partner	Tank-mix product rates	Crop stage
Herbicides:		
2,4-D Amine 500/600 ²	0.4 to 0.45 L/acre/0.283 - 0.372 L/acre	3 leaf - flag leaf
Allyl ¹	3.0 g/acre.	2 leaf - flag leaf
Approve	0.5 L/acre	4 leaf - flag leaf
Attain ⁴	Attain A: 0.18 to 0.24 L/acre Attain B: 0.30 to 0.40 L/acre	4 leaf - flag leaf
Benchmark	Benchmark A: 40 mL/acre Benchmark B: 0.453 L/acre	2 - 6 leaf
Buctril M ⁷	0.40 L/acre	2 - 5 leaf
Curtail M	0.6 L/acre to 0.80 L/acre	3 leaf - just before flag leaf
Dichlorprop-D	0.70 L/acre	4 leaf - early flag leaf (shot blade)
Dyvel	0.50 L/acre	2 - 5 leaf
Estaprop ⁷	0.70 L/acre	4 leaf - early flag leaf (shot blade)
Frontline ⁶ (Ladder only)	Frontline A: 40 mL/acre Frontline B: 0.28 L/acre	2 - 6 leaf
Koril	0.4856 L/acre	

Tank-mix partner	Tank-mix product rates	Crop stage
Herbicides:		
Lontrel	0.17 to 0.34 L/acre.	3 leaf - flag leaf
Lontrel + MCPA ester 500	0.11 to 0.17 L/acre + 0.45 L/acre	
MCPA 300 Sodium salt	0.49 to 1.1 L/acre	
MCPA Amine 500/600 ²	0.34 to 0.45/0.283 - 0.372 L/acre	
MCPA Ester 500	0.34 to 0.45 L/acre	
Mecoprop ⁴	2.2 to 2.8 L/acre	3 leaf - just before flag leaf
Mextrol 450	0.51 L/acre	2 leaf - flag leaf
Pardner	0.4 L/acre.	
Prestige ⁵	Prestige A: 0.243 to .32 L/acre Prestige B: 0.60 to 0.80 L/acre.	3 leaf - flag leaf
Refine SG ¹	12 g/acre	2 leaf - flag leaf
Refine SG Toss-N-Go ¹	12 g/acre	
Target ^{7, 8}	0.40 to 0.60 L/acre	2 leaf - 5 leaf
Thumper	0.4 L/acre	4 leaf - flag leaf
Trophy ³	Trophy A: 0.24 L/acre Trophy B: 0.45 L/acre	3 leaf - flag leaf
Insecticides		
Decis	0.032 L/acre to 0.049 L/acre	Prior to emergence of 4 th tiller
Metador	0.025 L/acre to 0.034 L/acre	
Fungicide		
Tilt/Propel	0.202 L/acre	Prior to emergence of 4 th tiller

¹ Addition of surfactants other than Score is not required.

² A reduction in control of green foxtail and wild oats may be observed when Horizon is tank mixed with 2,4-D Amine and MCPA Amine.

³ Rates above 2.0 L/ha may cause crop injury.

⁴ Tank mix with Mecoprop provides suppression of Canada thistle (top growth control).

⁵ Use with the high rate of Horizon for wild oat and green foxtail control.

⁶ Refer to broadleaf tank-mix label for list of weeds controlled at low and high use rates.

⁷ Barnyard grass is also controlled.

⁸ Persian damel is also controlled.

Tank Mixes of Horizon NG with Broadleaf Weed Herbicides – Aerial Application

Tank-mix partner	Product rates	Crop stage
Buctril M	0.40 L/acre	2 leaf to 5 leaf

Note: When tank mixing, always add the broadleaf herbicide (Buctril M) to the spray tank first, followed by Horizon NG herbicide.

Application information

With: Apply with ground sprayers or by aircraft using a drift control system.

Water volume: Ground: 20 - 40 L/acre. Air: 12 L/acre.

Application Tips

Weed control following application of clodinafop-propargyl alone or in combination with broadleaf weed herbicides can be reduced or delayed under stress conditions such as drought, heat, insufficient fertility, flooding or prolonged cool temperatures. Application under stress conditions is not recommended as it can damage the crop and weed regrowth can occur.

How it Works

Horizon is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Thorough coverage of the plants is essential for consistent control.

Expected results

Actively growing susceptible grasses stop growing within 48 hours of treatment. Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within one to three weeks after application. Further colour changes and complete control are achieved three to five weeks after application.

Restrictions

Rainfall: Rainfall within 30 minutes may reduce control.

Grazing: Do not graze or harvest treated crops for forage within 3 days of application.

Pre-harvest Intervals: : Leave at least 60 days from application to harvest.

Re-cropping: No restrictions.

Environmental Precautions

The active ingredient, clodinafop-propargyl, is highly toxic to fish. Do not apply clodinafop-propargyl based products directly to freshwater habitats.

Runoff: Avoid contamination of aquatic areas as a result of runoff.

Drift: Do not allow spray to drift to adjacent fields.

Toxicity

Practically non-toxic to mammals. Acute oral LD₅₀ (rats) = > 5,000 mg/kg.

Storage

Do not store below freezing. If stored for one year or longer, shake well before using.

Hyvar X/Hyvar X-L



Caution Poison

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Hyvar X (PCP # 8637)	E.I. duPont Canada	Bromacil: 80%	Wettable powder	2 kg, 25 kg
Hyvar X-L (PCP # 11018)		Bromacil: 240 g/L	Water soluble liquid	4 L, 10 L

Crops and Staging

Non-cropland areas such as railroad and pipeline right-of-ways, petroleum tank farms, lumberyards, storage areas, and industrial plant sites where bare ground is desired.

Weeds Controlled and Staging

Weeds	Staging
Annual and perennial weeds such as crabgrass, dandelion, foxtail, quackgrass, pigweed, ragweed, wild carrot	Apply just before and during the period of active growth
Brush species such as alder, ash, aspen poplar, balsam poplar, basswood, birch, cherry, dogwood, elm, hawthorn, hemlock, maple, oak, pine, spruce, sumac, willow	Apply in spring or summer as basal treatment

Rate

Weeds	Hyvar X	Hyvar X-L
Annual and perennial grasses and broadleaf weeds	Initial: 3.13 - 5.45 kg/acre	Initial: 12 - 18 L/acre
	Re-treatment: 1.31 - 2.73 kg/acre	Re-treatment: 7 - 9 L/acre
	Small areas: 135 g per 100 m ²	Small areas: 450 mL per 100 m ²
Brush species	Mix 870 grams in 10 L of water and apply 30 - 60 mL per stem 5 - 10 cm in basal diameter	Mix 1 L in 5 L of water and apply 55 mL per stem, 5 - 10 cm in basal diameter

Tank Mixes

None.

Application Information

With: Apply with power sprayer, handguns, backpack sprayer. Watering can may be used to treat small areas.

Water Volume: Fixed boom sprayer: 100 - 1,000 L/acre. Use enough water to uniformly cover the area to be treated. Handgun: 646 L/acre.

Application Tips

If dense growth is present, results will be improved if vegetation is removed before treatment. Do not apply closer than 1.5 times the height of nearby trees. Roots from large trees may extend well beyond the height of the tree and may extend beneath areas to be treated. Be cautious where trees are in close proximity to the treatment site. Do not apply to brush standing in water, lawns, walks, driveways, tennis courts or similar areas. Applying, draining or flushing equipment too near feeding roots of susceptible vegetation may cause injury. Thoroughly clean all traces of Hyvar from application equipment immediately after use.

How it Works

Bromacil is readily absorbed through the roots but much less readily through the leaves. Once in the plant, it inhibits photosynthesis.

Expected Results

Susceptible plants become chlorotic and then die. Effects are slow to appear and may not become apparent until the chemical has been carried into the root zone of the weeds by moisture. The degree of control and duration of effect will vary with the amount of chemical applied, soil type, rainfall and other conditions.

Restrictions

Rainfall: Rainfall required to carry the chemical into the root zone where it is absorbed.

Environmental Precautions

Bromacil is slightly toxic to aquatic organisms, including fish. Do not apply directly to water or contaminate water when cleaning equipment.

Runoff: Avoid contamination of aquatic areas as a result of runoff.

Leaching: Bromacil is known to leach through soil and has been found in groundwater as a result of normal field use. Users are advised not to apply in areas where soils are permeable, particularly where groundwater is used for drinking water.

Drift: All crops and ornamentals are sensitive to this chemical. Avoid drift to the desirable plants. A buffer zone is required between the application site and sensitive areas.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 2,000 mg/kg. Hyvar is a moderate eye irritant. Intake of Hyvar can cause damage to lungs, liver, heart and kidney and can lead to a coma. May also cause blindness.

Storage

Hyvar X: Store in a cool, dry place. Hyvar X-L: Combustible, keep away from heat or open flame. Do not allow to freeze.

Infinity



Warning Poison

Group 6, 27

Formulations

Product	Company	Active ingredient	Formulation	Container size
Infinity (PCP # 28738)	Bayer CropScience	Prasulfotole: 37.5 g/L + bromoxynil: 210 g/L	Emulsifiable concentrate	2 x 6.7 L jug.

Crops and Staging

Crop	Staging
Barley, wheat (including durum), winter wheat, timothy (seed production only), triticale	1 leaf stage of growth until the flag leaf is just visible but still rolled

Weeds and Staging

Weeds controlled or suppressed at 1 - 6 leaf stage, unless otherwise stated

annual sow-thistle	flixweed	round-leaved mallow*	wild buckwheat
chickweed (includes Group 2 resistant biotypes)	hemp-nettle	Russian thistle (up to 10 cm in height)	wild mustard
Cleavers ¹ (controls both Group 2 and Group 4 resistant biotypes)	kochia (controls Group 2 resistant biotypes)	shepherd's purse	
Canada thistle*	lamb's-quarters	stinkweed	
common ragweed	pale smartweed	volunteer canola (including herbicide tolerant)	
dandelion* (up to 10 cm in height and 25 cm in diameter)	perennial sow-thistle*		
	redroot pigweed		

* Suppression only.

¹ For control of cleavers at the 4 to 6-whorl growth stage, add ammonium sulphate at 202 g/ac (99%) or 1 L/ha (49% solution). If using an ammonium sulphate product with a different concentration, adjust the rate accordingly.

Tank Mixes

Tank-mix partner	Infinity plus tank mix partner rate	Additional weeds controlled and comments
In spring wheat (including durum) and barley		
Puma 120 Super	Infinity @ 0.33 L/acre + Puma 120 Super @ 160 mL/acre	Green foxtail. Apply when foxtail is in 1 - 6 leaf stage Wheat: 1 - 6 leaf stage, barley: 1 - 5 leaf stage
	Infinity @ 0.33 L/acre + Puma 120 Super @ 310 mL/acre	Barnyard grass, green foxtail, yellow foxtail, wild oats Apply when grasses are in 1 - 6 leaf stage
Spring wheat (including durum), winter wheat, barley and triticale		
Achieve Liquid	Infinity @ 0.33 L/acre + Achieve Liquid @ 200 mL/acre + Turbocharge adjuvant @ 0.5 % v/v.	Barnyard grass, Persian damel, green and yellow foxtail, volunteer oats, wild oats. Apply when barnyard grass and Persian damel is in 1 - 4 leaf stage, foxtail is in 1 - 5 leaf stage and volunteer oats and wild oats are in 1 - 6 leaf stage
Spring wheat (excluding durum) and barley only		
Axial 100 EC	Infinity @ 0.33 L/acre + Axial 100 EC @ 243 mL/acre + Adigor adjuvant @ 283 mL/acre	Apply when grasses are in 1 - 6 leaf stage, prior to 4 th tiller stage of growth

Application Information

With: Apply with ground sprayers or by air.

Water volume: Ground: minimum of 18.9 L/ac. Air: minimum of 11.3 L/ac.

Application Tips

Under cool and/or dry conditions, activity may be reduced or delayed. Weed control may also be reduced if application is made when weeds are dust covered or in the presence of heavy dew, fog or mist/rain. If crop is under stress due to abnormal environmental conditions, delay application until stress passes and after both crop and weeds have resumed active growth.

How it Works

Pyrasulfotole is absorbed through leaves and is translocated to meristematic regions where it inhibits the HPPD enzyme. Pyrasulfotole inhibits plant pigment biosynthesis and photosynthesis.

Expected Results

Small burnt spots on the broadleaf weeds can appear in hours. Lack of plant pigments shuts down the photosynthetic pathway, resulting in bleaching symptoms and rapid death, normally in 6 - 14 days.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce effectiveness.

Grazing: Do not graze the treated crops or cut for forage or hay within 25 days after application.

Pre-harvest Interval: Do not harvest wheat or triticale for grain or straw within 50 days of application. Do not harvest barley for grain or straw within 45 days of application.

Re-entry: Do not enter or allow worker entry into treated areas until 24 hours after application.

Re-cropping: Alfalfa, barley, canary seed, canola, flax, (including low linolenic acid varieties) field peas, tame oats, spring wheat (including durum) may be planted 10 months after application. Lentils can be grown 22 months after application. Field peas may be grown the year following Infinity application in all Black, Gray-Wooded and Dark Brown soil zones. Do not plant field peas the year following Infinity application in the Brown soil zone where organic matter content is less than 2.5% and soil pH is above 7.5.

Environmental Precautions

Infinity contains distillates that are toxic to aquatic organisms and non-target terrestrial plants. Avoid contamination of aquatic systems during applications.

Runoff: Avoid contamination of aquatic areas as a result of runoff.

Leaching: This product moves in water and is a possible leaching problem in coarse soils or where the water table is shallow.

Drift: Leave a 1 metre buffer between the last spray path and sensitive aquatic or wetland habitats and 5 metres to non-target plants and upland habitats.

Toxicity

Pyrasulfotole is practically non-toxic to wild mammals, birds, fish and aquatic invertebrates, earthworms and bees and does not negatively affect soil microorganisms. Infinity is toxic to aquatic plants and non-target terrestrial plants.

Storage

Do not store at temperatures below -20°C. If stored for one year or longer, shake well before using.

Karmex XP/Diurex 80 W

Group 7

Formulations

Product	Company	Active ingredient	Formulation	Container size
Karmex XP (PCP # 21252)	E.I. duPont Canada	Diuron: 80%	Dry flowable	2 kg, 25 kg
Diurex 80 W (PCP # 14135)	United Agri Products		WDG	2.27 kg

Crops, Weeds Controlled, Timing and Rate

General non-selective weed control - annual and perennial grasses and broadleaf weed seedlings

Crop	Rate	Timing and specific comments
Non-crop areas	Initial Treatment Sandy or sandy loam: 5.8 - 11 kg/acre Clay or high organic soils: 16 - 22 kg/acre Re-treatment: 2.0 kg/acre	Apply at any time, except when ground is frozen, providing adequate moisture is received by rainfall or artificial means. Best results are obtained when applied shortly before weed growth begins. Dense growth should be removed.
Spot treatment and small areas	Initial Treatment: 0.11 kg per 100 m ² or 4.5 kg/acre Re-treatment: 0.165 kg per 100 m ²	Observe a minimum interval of 90 days between the first application and re-treatment. A maximum of 2 applications per season is permitted to a maximum seasonal use rate of 6.6 kg/acre per year.
Restricted uses (requires authorization by provincial permit)		
Irrigation and drainage ditches	Initial treatment: 0.11 kg per 100 m ² or 4.5 kg/acre in 100 - 200 L solution/acre Re-treatment: 0.165 kg per 100 m ²	Apply during the non-crop season and when ditch is not in use.
Weed control in crop		
Asparagus (established)	Light sandy soils or soils in low organic matter: 0.45 - 0.9 kg/acre High clay soils or soils with high organic matter: 0.9 - 1.8 kg/acre	No earlier than 4 weeks before spear emergence or later than early cutting.

Application Information

Diuron or Karmex XP may be applied with ground sprayer, backpack sprayer or watering can.

Water Volume: Use sufficient water (100 - 160 L per acre) to provide thorough and uniform coverage.

Application Tips

Non-crop Areas: Do not use on sand, loam sand or gravelly soils with less than 1% organic matter. Do not apply to slopes as soil erosion may occur.

Irrigation and Drainage Ditches: To minimize movement of Karmex XP/Diuron with irrigation water and avoid crop injury, it is essential that the herbicides be fixed in the treated soil by moisture. Apply before expected seasonal rainfall, if possible when soil in the ditch is still moist. If rainfall has not totaled at least 10 cm following treatment and before intended use of irrigation ditch, fill with water and allow to stand for 72 hours; drain off waste and remaining water before using ditch.

How it Works

Diuron is readily absorbed through the root system and less readily absorbed through stem and foliage.

Expected Results

Susceptible plants become chlorotic soon after treatment and then die. Degree of control and duration of effect will vary with the amount of chemical applied, soil type, rainfall and other conditions. Regrowth of plantain, thistle, or

wild carrot will indicate that retreatment is necessary. Poor control may be expected if inadequate rate or weeds too old or insufficient rainfall.

Restrictions

Rainfall: Rainfall needed to activate the chemical, carrying it into the root zone.

Grazing: Do not graze the treated crops or cut for hay; sufficient data are not available to support such use.

Re-cropping: Do not replant treated areas to any crop within 2 years after last treatment as injury to subsequent crops may result.

Environmental Precautions

Diuron is toxic to aquatic organisms. Do not apply directly to aquatic habitats, irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff: Avoid contamination of aquatic areas as a result of runoff. Avoid application of this product when heavy rain is forecast.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or where the depth to the water table is shallow.

Drift: Leave a 15 metre buffer between the last spray path and aquatic or wetland habitats with water bodies <1 meter deep and 10 meters with water bodies >1 meter deep and up to 60 metres to sensitive terrestrial habitats when applying by ground.

Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 3,400 mg/kg. Non-toxic to birds and fish.

Storage

Store in a cool, dry place.



Warning Irritant

Krenite

Group 27

Formulations

Product	Company	Active ingredient	Formulation	Container size
Krenite (PCP # 14064)	E.I. duPont Canada	Fosamine-ammonium: 480 g/L	Water soluble liquid	10 L pack

Crops

Brush control on non-cropland areas - railroad, pipeline, utility and highway rights-of-way, storage areas, and industrial plant sites.

Brush Controlled Rate and Timing

Apply in mid June to end of July

Brush controlled at 10.0 L/1000 L of water. Add 1 - 2 L of surfactant (Tween 20)				
alder	beech	elm,	maple	pine
ash	birch	hazel	oak	trembling aspen
Brush controlled at 15.0 L/1000 L of water. Add 1 - 2 L of surfactant (Tween 20)				
large tooth aspen,	balsam fir	cherry	hemlock	white spruce

Note: Balsam poplar and cedar may not respond to treatment at recommended rates.

Krenite (cont'd)**Tank Mixes**

None.

Application Information

Apply with high-pressure ground sprayers. Do not apply by air.

Water Volume: 200 - 1200 L/acre.

Application Tips

Use sufficient water volume to ensure good penetration to wet stems and trunks of target brush as well as leaves and buds. A non-ionic surfactant is required to control most conifers and to control the root suckering of deciduous brush. Thoroughly clean all traces of Krenite from application equipment after use.

How it Works

Absorbed by leaves, stems and buds. Restricts bud development the following spring.

Expected Results

Response may not be observed until the following spring, particularly if minimum recommended rates are used or if cool temperatures prevail when spray is applied. Susceptible treated plants fail to refoliate and subsequently die.

Restrictions

Rainfall: If rainfall occurs within 24 hours, effectiveness may be decreased.

Grazing: Do not graze on land treated with Krenite

Environmental Precautions

Do not directly apply to any aquatic habitats that are traversed by the right-of-way. Do not spray ditch banks, sites that are adjacent to and surrounding domestic water supply reservoirs, supply streams, lakes or ponds.

Drift: Do not allow drift or spray mist to contact desirable trees, shrubs, or other plants, as injury may result.

Toxicity

Krenite has a low acute mammalian toxicity. Acute oral LD₅₀ (rats) = > 5,000 mg/kg. Krenite is a moderate to severe eye irritant.

Storage

Store in a cool, dry place.

Krovar 1

Caution Poison

Group 5, 7

Formulations

Product	Company	Active ingredient	Formulation	Container size
Krovar 1 (PCP # 22964)	E.I. duPont Canada	Bromacil: 40% + diuron: 40%	Dry flowable	2 kg, 25 kg

Crops

Non-cropland areas - railroad, pipeline, utility and highway rights-of-way, storage areas, and industrial plant sites.

Weeds Controlled, Rate and Timing

Most annual and perennial grasses and broadleaved weeds.

Crop	Rate	Timing and specific comments
Non-crop areas	Initial Treatment Sandy or sandy loam: 5.5 kg/acre Clay or high organic soils: 7.3 kg/acre Re-treatment: 2.75 - 3.6 kg/acre	Apply just before or during the period of active growth of weeds. Observe a minimum interval of 90 days between the first application and re-treatment. A maximum of 2 applications per season is permitted to a maximum seasonal use rate of 13.5 kg/acre per year.
Small areas	180 g per 100 m ² or 7.3 kg/acre. Apply in a minimum water volume of 2 L per 100 g	

Tank Mixes

Tank-mix partner	Krovar 1 plus tank mix partner rate	Additional weeds controlled and comments
Telar	Krovar 1 @ 5.5 - 7.3 kg/acre + Telar @ 48 g/acre + Non-ionic surfactant @ 1% v/v	Weeds controlled by Telar

Application Information

With: Boom spray, handgun, backpack or sprinkling can. Do not apply by air.

Water volume: Minimum of 20 L/ kg of Krovar 1. Use enough water to uniformly cover area to be treated.

Application Tips

During spraying, Krovar 1 must be kept in suspension at all times by continuous agitation. Sufficient moisture from rainfall or artificial means is necessary after treatment to carry the chemical into the root zone of the weeds. If dense growth is present, results will be improved if vegetation is removed before treatment. Do not apply when ground is frozen. Do not treat ditches, wellheads, bridge approaches. Do not treat sites that are adjacent to and surrounding water supply reservoirs, supply streams, lakes and ponds.

How it Works

Krovar 1 is readily absorbed through the roots, leaves and stems.

Expected Results

Plants become chlorotic and then die. The degree of control and duration of effect will vary with the amount of chemical applied, soil type, rainfall and other factors. Poor results occur if weeds are too mature or if insufficient rainfall.

Restrictions

Rainfall: Rainfall needed to move the chemical to the root zone.

Grazing: Do not graze the treated crops or cut for hay; sufficient data are not available to support such use.

Environmental Precautions

Krovar 1 is toxic to aquatic organisms. Do not apply directly or indirectly to aquatic habitats.

Runoff: Avoid contamination of aquatic areas as a result of runoff.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or where the depth to the water table is shallow.

Drift: Apply only when the potential for drift is minimal. A buffer zone of 15 metres is required from sensitive aquatic habitats < 1m in depth and 10 metres when water depth is > 1m. A buffer zone of 60 metres is required between the point of direct application and the closest downwind edge of sensitive terrestrial habitats.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = bromacil 5,200 mg/kg, diuron = 3,400 mg/kg. Non-toxic to birds. Toxic to fish.

Storage

Store in a cool, dry place.

Liberty 150 SN



Caution Poison

Group 10

Formulations

Product	Company	Active ingredient	Formulation	Container size
Liberty 150 SN (PCP # 26694)	Bayer CropScience	Glufosinate-ammonium: 150 g/L	Solution	13.5 L, 108 L

Note: To purchase Liberty 150 SN or Liberty 200 SN herbicides, growers must have a signed and approved Liberty and Trait Agreement (LTA)

Crops and Stage

Crop	Stage
Liberty Link canola (Liberty 150 SN)	Cotyledon stage up to the early bolting stage of canola.

Note: Temporary crop discoloration may be observed after application.

Weeds, Staging and Rates

Weeds	Leaf stage	Rate per acre
cow-cockle (canola only)	1 - 4 leaf	0.54 L
green foxtail	1 - 6 leaf (max 3 tillers)	0.54 L
Above weeds plus the following		
Weeds	Leaf stage	Rate per acre
barnyard grass	1 - 4 leaf	0.81 L
lady's-thumb, lamb's-quarters, smartweed	1 - 6 leaf	
Russian thistle	up to 8 cm tall	
stinkweed	1 - 8 leaf	
volunteer flax	up to 6 cm	
wild mustard	1 - 5 leaf	
All of the above weeds plus the following		
Weeds	Leaf stage	Rate per acre
Canada thistle*	up to 10 cm tall	1.1 L - 1.35 L
chickweed	1 - 4 pair leaves	1.1 L
hempsnettle	1 - 3 pair leaves	
kochia	up to 8 cm tall	
perennial sow-thistle	1 - 8 leaf	
redroot pigweed	1 - 4 leaf	
scentless chamomile	up to 10 cm tall	
shepherd's-purse	1 - 6 leaf	1.1 L
volunteer barley**, volunteer wheat, round leaf mallow	1 - 4 leaf (max.2 tillers for cereals)	
wild buckwheat	1 - 3 leaf	

All of the above weeds plus the following

Weeds	Leaf stage	Rate per acre
cleavers	1 - 2 whorls	1.35 L
dandelion	Rosettes > 15 cm across	
flixweed	Up to 10 cm tall	
hempnettle	1 - 4 pair leaves	
quackgrass **	1 - 4 leaf	1.35 L
stork's-bill	1 - 3 pair	
wild oats	1 - 4 leaf (max. 2 tillers)	1.35 L

* Top growth suppression. Plants may return from surviving growing plants

** Suppression only

Second application: A second application of Liberty can be made to fields treated initially with up to 1.6 L/acre with 150 SN in canola. With Liberty 150 SN a second application (in canola) of up to 1.35 L/ac. If 1.35 L/ac was applied as a first application, a second application of 1.6 L/ac could be applied. Do not apply more than a total of 2.97 L/ac per year. Apply when the new weed growth is in the correct leaf stage and up to early bolting stage of canola and a maximum 8 leaf stage in corn.

Third application: (hybrid seed production only)

Three applications of Liberty 150 SN only, each at 1.35 L/acre, may be required for hybrid seed production. The third application must occur prior to bolting of the canola crop.

Tank Mixes

Tank mix partner	Liberty + tank mix partner rate	Additional weeds controlled and remarks
Centurion or Select	Liberty@ 1.08 - 1.35 L/acre + Centurion or Select @ 25 or 50 mL/acre + Adjuvant @ 0.51 v/v	Enhance control of volunteer barley and wild oats. Apply when the weeds are in the 1-4 leaf stage with a maximum of 2 tillers

Application Information

Apply with ground equipment or aircraft for Liberty 150 SN.

Water volume: Ground Application: Minimum of 45 L/ac of water. Air: Minimum of 22 L/ac of water

Application Tips

For best results, apply to emerged, young actively growing weeds. Weeds that emerge after application will not be controlled. When a rate range is given, the higher rate should be used: (1) when weed or crop growth is dense, (2) when the weeds are large and/or mature - i.e. advanced leaf stages and plant height, and (3) when environmental conditions are cool and dry.

How it Works

Liberty works primarily as a contact herbicide. Thorough coverage of the weeds to be controlled is essential. Absorbed by all leaf and stem surfaces. It interferes with plants' ability to detoxify ammonia. The speed of action of Liberty is influenced by environmental factors. At cool temperatures (below 10°C), poor moisture and low humidity, speed of action may be reduced.

Expected Results

Generally, visual symptoms appear 2 - 4 days after application.

Restrictions

Rainfall: If rainfall occurs within 4 hours of application, effectiveness may be reduced.

Grazing: Do not graze the treated crop or cut for hay; sufficient data are not available to support such use.

Re-entry: Do not re-enter treated areas for 24 hours after application without protective clothing as for spraying.

Re-cropping: There are no cropping or rotational restrictions after application.

Liberty 150 SN (cont'd)**Environmental Precautions**

Highly toxic to aquatic organisms and non-target terrestrial plants. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water.

Runoff: Do not allow getting into surface water, drains and groundwater.

Drift: Do not apply within 15 metres of environmentally sensitive areas when applying by ground equipment. Do not apply within 30 metres of environmentally sensitive areas when applying by air.

Toxicity

Acute oral LD₅₀ (rats) = 2,000 mg/kg. No allergic potential.

Storage

Do not store below freezing. If stored for one year or longer, shake well before using.



Caution Poison

Lontrel 360

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Lontrel 360 (PCP # 23545)	Dow AgroSciences	Clopyralid: 360 g/L	Solution	4.45 L

Crops, Staging and Rate

Crop	Staging	Rate per acre
Barley, oats, spring wheat	3 leaf - flag leaf emergence	85 - 227 mL
Canola incl. glyphosate tolerant canola	2 - 6 leaf	170 - 336 mL
Flax (including low linolenic acid varieties)	5 - 10 cm in height	
Seedling forage grasses*	2 - 4 leaf	
Established forage grasses*	Shot-blade stage, or in the fall after harvest or in early spring	
Summerfallow and non-crop farmland	Stage according to weeds	336 mL
Sugar beets	Cotyledon to 8 leaf stage	226 - 335 mL
Shelterbelts**	Stage according to weeds	335 mL
Strawberry (renovation)	Immediately after harvest or before mowing	336 mL

* Forage grasses: Kentucky bluegrass, smooth brome grass, reed canary grass, creeping red fescue, meadow fescue, tall fescue, meadow foxtail, orchard grass, altai wild ryegrass, Russian wild ryegrass, timothy, crested wheatgrass, intermediate wheatgrass, slender wheatgrass streambank wheatgrass.

** Shelterbelt consisting of villosa lilac, acute willow, Colorado spruce, white spruce, buffaloberry and chokecherry.

Weeds Controlled and Staging

Canada thistle: Rosette to pre-bud stage. Others: young and actively growing.

Weeds controlled at 170 mL/acre

alsike clover

Canada thistle*

vetch

Weeds controlled at 227 mL/acre

Canada thistle

ox-eye daisy **

volunteer alfalfa (5 - 50 cm)

common groundsel

perennial sow-thistle*

wild buckwheat

common ragweed

scentless chamomile

season-long control of Canada thistle

sheep sorrel **

@ 336 mL/acre

* Top growth ** Suppression

Control of Canada thistle

For in crop control of top growth of Canada thistle, apply Lontrel 360 at the rate of 170 mL/acre. This will suppress top growth of Canada thistle for 6 to 8 weeks. Some re-growth may occur by the end of the season but this will not interfere with the harvesting of the crop.

For season long control of top growth of Canada thistle, apply Lontrel 360 at the rate of 227 mL/acre. This rate will generally provide season long control of Canada thistle. Not all rhizomes will be killed and some re-growth may occur by the end of the growing season.

For season long control of top growth, with a reduction of Canada thistle population in the following year, apply Lontrel 360 at the rate of 336 mL/acre. This rate will provide season long control of Canada thistle and suppression into the following season, resulting in a reduction of the total number of Canada thistle shoots in the treated area

Tank Mixes

Tank-mix partner	Lontrel 360 plus tank mix partner rate	Additional weeds controlled
Canola		
Poast Ultra + Merge Adjuvant	Lontrel @ 170 - 335 mL/acre + Poast Ultra @ 0.19 - 0.45 L/acre + Merge @ 0.4 L/acre	Canada thistle, wild buckwheat, wild oats, green foxtail, volunteer barley, volunteer wheat, and volunteer oats.
Select + Amigo adjuvant	Lontrel @ 170 - 335 mL/acre + Select @ 150 mL/acre + Amigo @ 0.5%v/v	
CLEARFIELD canola		
Odyssey	Lontrel @ 170 - 336 mL/acre + Odyssey @ 17.3 g/acre	Grasses plus Lontrel susceptible weeds
Roundup Ready canola		
Glyphosate	Lontrel @ 45 mL/acre + Glyphosate @ 505 mL/acre (356 - 360 g/L formulation)	Canada thistle (season-long top growth), dandelions < 15 cm diameter (season-long top growth), dandelions > 15 cm diameter (suppression), perennial sow-thistle (season-long top growth), wild buckwheat
Flax		
MCPA amine or ester	Lontrel @ 170 mL/acre + MCPA 500 ester @ up to 0.45L/acre	Canada thistle (top growth) + MCPA susceptible weeds
	Lontrel @ 227 mL/acre + MCPA 500 ester @ up to 0.45L/acre	Canada thistle (season-long) + MCPA susceptible weeds
	Lontrel @ 336 mL/acre + MCPA 500 ester @ up to 0.45L/acre	Canada thistle (season-long with suppression into the following year), common groundsel, perennial sow thistle (top growth), scentless chamomile, wild buckwheat
Barley, oats and wheat		
2,4-D or MCPA amine or ester 500 formulation	Lontrel @ 113 mL + MCPA or 2,4-D @ 113 mL/acre	Canada thistle (top growth, 6 - 8 weeks) plus MCPA or 2,4-D susceptible weeds
	Lontrel @ 170 mL + MCPA or 2,4-D @ 113 mL/acre	Canada thistle (season-long) plus MCPA or 2,4-D susceptible weeds
Refine Extra + 2,4-D (600 g/L) or MCPA (500 g/L) amine or ester	Lontrel @ 85 mL/acre + 2,4-D or MCPA amine @ 339 mL/acre or 2,4-D @ 283 mL/acre + Refine Extra 8 g/acre. Add Agral 90 at 0.2% v/v to this tank mixture.	Canada thistle (season-long), cleavers (suppression), lady's thumb, perennial sow thistle, stinkweed, wild buckwheat, volunteer canola, wild mustard,

Note: Do not use 2,4-D on oats due to the probability of crop injury.

Acres Treated per 4.45 L Jug

- Applications of 170 mL/acre will treat 26.2 acres.
- Applications of 227 mL/acre will treat 19.70 acres.
- Applications of 336 mL/acre will treat 13.3 acres.

Lontrel 360 (cont'd)**Application Information**

With: Apply with ground equipment only.

Water volume: 40 - 80 L/ac.

Application Tips

Do not use products containing 2,4-D on oats due to probability of crop injury. Rates of MCPA ester of 170 g active ingredients/ac or higher or MCPA amine of 200 g active ingredient/ac may cause some delay in maturity of flax, resulting in yield reduction. Make sure the sprayer tank has been thoroughly cleaned before Lontrel is mixed. Treat crops during warm weather when weeds are actively growing. Best results are obtained when Canada thistle is actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of Canada thistle may be severely reduced. Sow thistle plants emerging after spraying will not be controlled. Where contact herbicides are used, such as bromoxynil, that damage the leaves of the Canada thistle, apply Lontrel 14 days prior or after an interval of 14 days, which allows Canada thistle to recover and resume growth.

Forage grasses: For control of the weeds listed on the label plus alsike clover, apply Lontrel at the rate of 170 - 336 mL/ac in 45 - 90 L/ac of water. Make one application per season by ground sprayer. For seedling grasses, apply at the 3 leaf stage and beyond. For established grasses, apply in the fall after harvest or early spring.

How it Works

Clopyralid is a systemic, hormone-type herbicide. It is absorbed by leaf and stem surfaces and is readily translocated. Maximum efficacy results from foliar application to young actively growing plants.

Expected Results

Herbicide symptoms on affected plants include swollen growing points and roots, cupping of leaves, twisted and distorted stems and leaves. Plants will gradually stop growing and change colour, first to dark green and then to yellow before turning brown as they die. Maximum effectiveness results from foliar applications to young actively growing plants. Death of weeds may not occur until 14 - 21 days after application. With the lowest rate of Lontrel on Canada thistle, some regrowth may occur by the end of the season, but this will not interfere with harvesting of the crop.

Restrictions

Rainfall: A rain-free period of 4 - 6 hours after application is required.

Grazing: There are no restrictions on the grazing of crops or forages treated with Lontrel 360. If necessary, treated areas may be grazed immediately following application.

Pre-harvest Interval: Sugar beets - Do not apply within 90 days of harvest. Strawberry - P.H.I. = 200 days.

Re-cropping: Fields treated with Lontrel can be seeded to barley, canola, forage grasses, flax, mustard, oats, rye, wheat or summerfallowed. Do not seed to crops other than those listed above for at least one year after treatment.

Use of straw and manure from treated crops: Lontrel residues in straw may be harmful to susceptible plants. Do not use straw from treated crops for composting or mulching on susceptible broadleaf crops. Manure can be spread on fields that will be seeded to barley, flax, oats, canola (rapeseed), rye or wheat. Do not grow susceptible crops such as peas, beans, lentils, potatoes, sunflowers or other sensitive crops on land that has been mulched with straw containing Lontrel 360 residues within the last 12 months.

Environmental Precautions

Small amounts of drift may damage sensitive plants such as legumes.

Toxicity

Clopyralid is practically non-toxic to aquatic organisms, including fish on an acute basis. Clopyralid has a very low acute mammalian toxicity. Acute oral LC_{50} (rats) = >2,000 mg/kg. It is practically non-toxic to bees.

Storage

Store in heated storage away from open flames or sparks. If frozen, warm slowly to room temperature and mix thoroughly before use.

Lorox/Linuron



Caution Poison

Group 7

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Lorox L (PCP # 16279)	Tessenderlo Kerley Inc.	Linuron: 480 g/L	Liquid	10 L
Lorox DF (PCP#20193)		Linuron: 50%	Dry flowable	5, 10, kg jug
Linuron 400 (PCP # 15544)	United Agri Products	Linuron: 400 g/L	Liquid	10 L

Crops, Staging and Rate

Crop	Staging	Rate per acre	
		Lorox L	Linuron
Post-emergent applications			
Barley, oats and spring wheat (including durum)***	2 - 4 leaf.	0.17 - 0.22 L	0.20 - 0.26 L
Field corn (directed spray)*	Apply when corn is at least 38 cm tall	1.16 - 2.18 L	0.97 - 1.82 L
Shelterbelts (established)**	In the spring before buds open and weeds are less than 10 cm tall	1.82 L	2.18 L
Pre-emergent applications			
Corn: less than 2.0% OM	Apply before corn emerges. Must be tank mixed with Atrazine.	0.91 L	1.09 L
Corn: 2 - 5 % OM		1.31 L	1.58 L
Potatoes: less than 2.0% OM	Apply just before crop emerges or when tops are completely covered by hilling.	0.91 L	1.1 - 1.72 L
Potatoes: 2 - 5 % OM		1.82 L	1.72 - 2.22 L
Banded Applications: Lorox L and Linuron can also applied in a narrow band directly over the row in a wide row crops Use cultivation for weed control in between the rows. For band application, use proportionately less product. For example, for 25 cm band on 75 cm row, use 1/3 of the broadcast rate.			

* Do not spray over top of corn

** Established shelterbelts consisting of American elm, boxelder, caragana, Colorado spruce, green ash, poplar, scotch pine, Siberian elm, white spruce, willow. Apply only on stock planted for at least one year as a directed spray under the trees and bushes.

*** Must be tank mixed with MCPA amine 500 when applying to wheat, oats and barley or MCPA K-salt when applying to wheat and barley.

Weeds Controlled and Staging

Apply when annual broadleaf weeds are in 2 - 4 leaf stage and when green foxtail is in 1 - 3 leaf stage.

When tank mixed with MCPA amine 500 in cereals, following weeds are controlled

Canada thistle	green foxtail*	ragweed	tartary buckwheat
chickweed	green smartweed	redroot pigweed	wild buckwheat
corn spurry	hemp-nettle	shepherd's-purse	
cow cockle	lady's-thumb	stinkweed	
flixweed	lamb's-quarters	stork's-bill	

* Suppression

Lorox/Linuron (cont'd)**Pre-emergent application and post emergent application in corn (directed applications and shelterbelts)**

annual sow-thistle (seedlings)	goosefoot	prostrate pigweed	wild buckwheat
barnyard grass*	knotweed	purslane	wild radish**
common chickweed	kochia**	ragweed	wormseed mustard
common groundsel**	lamb's quarters	redroot pigweed	
corn spurry**	perennial sow-thistle**	shepherd's purse	
dandelion (seedlings)**	plantain (seedlings)**	smartweed	

* Suppression

** Not registered with Lorox L

Tank Mixes

Tank mix partner	Linuron/Lorox + tank mix partner rate	Additional weeds controlled
Barley, oats and spring wheat, including durum (post-emergence)		
MCPA amine 500	Lorox @ 0.17 - 0.22 L or Linuron @ 0.20 - 0.26 L + MCPA ester 0.34 - 0.45 L/acre	See above table on weeds controlled by Lorox/Linuron + MCPA tank mixes.
MCPA K-salt 400	Lorox @ 0.17 - 0.22 L or Linuron @ 0.20 - 0.26 L + MCPA K-salt @ 0.4 - 0.57 L/acre	
Corn (pre-emergence)		
Atrazine	Less than 2.0 % OM: Linuron @ 1.1 + Atrazine @ 0.15 - 2.5 L/acre 2 - 5 % OM: Linuron @ 1.58 + Atrazine @ 0.15 - 2.5 L/acre	

Application Information

With: Ground equipment.

Water volume: Cereals: 40 L/ac minimum. Potatoes: 120 L/acre. 90 - 135 L/acre Corn: pre-emergent: 90 - 135 L/ac; post-emergent 70 - 140 L/ac.**Application Tips**

Do not use on sandy or coarse-textured soils, low in organic matter, as crop injury may result. Do not use when crops are under drought stress. Fruit trees: avoid contact with fruit, foliage and green bark with spray or drift as injury may result.

How it Works

A systemic herbicide absorbed by leaves and roots. Yellowing (chlorosis), stunting and finally death occurs 10 - 14 days after treatment.

Expected Results**Weeds:** Yellowing starts 7 - 10 days after application. Effect greatest under excellent growing conditions. Weed control will vary depending on species, time of application and growing conditions.**Crop:** A slight yellowing of crop, leaf tip and leaf margin burn may be seen 7 - 10 days after application. Crop recovers within 14 - 18 days. Crop injury can occur if applied during period of high heat.**Restrictions****Rainfall:** Heavy rainfall within 2 hours may decrease activity. Pre-emergent treatment requires rainfall or irrigation for activation. Carrots, corn or potatoes may be severely injured if unusually heavy rains follow application.**Grazing:** Do not graze or cut for hay; there are not sufficient data available to support such use.**Re-cropping:** Do not apply post-emergent corn treatment within 60 days of harvest. 25% carryover into next growing season if rates are 1.8 L/ac or higher**Environmental Precaution**

Linuron is toxic to fish and aquatic invertebrates. Do not apply directly to water or to areas where surface water is present.

Runoff: Avoid contamination of surface water through spray drift or surface runoff.

Leaching: Use of this material where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Toxicity

Low acute toxicity. Acute oral LD₅₀ (rats) = 3,600 mg/kg. Very toxic to fish. Non-toxic to bees.

Storage

Lorox L/Linuron: Store in a heated area. Do not freeze as settling may occur. If frozen, thoroughly mix to resuspend.



Warning Poison

MCPA

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
MCPA 500 amine (PCP# 20308)	IPCO	500 g/L	Solution	2 x 10 L jugs
MCPA 500 amine (PCP# 9516)	United Agri Products	500 g/L	Solution	2 x 10 L jugs
MCPA 600 amine (PCP# 28384)	Nufarm	600 g/L	Solution	2 x 10 L jugs
MCPA 500 amine (PCP# 29244)	Viterra	500 g/L	Solution	2 x 10 L jugs
MCPA 600 ester (PCP# 27802)	IPCO	600 g/L	EC	2 x 10 L jugs
MCPA 600 ester (PCP# 27803)	Nufarm	600 g/L	EC	2 x 10 L jugs
MCPA 600 ester (PCP# 27804)	United Agri Products	600 g/L	EC	2 x 10 L jugs
MCPA 600 ester (PCP# 29001)	Viterra	600 g/L	EC	2 x 10 L jugs, 115 L
MCPA 400 Potassium salt (PCP# 20305)	IPCO	400 g/L	Solution	2 x 10 L jugs
MCPA 400 Potassium salt (PCP# 14188)	United Agri Products	400 g/L	Solution	2 x 10 L jugs
MCPA 300 Sodium salt (PCP# 20306)	IPCO	300 g/L	Solution	2 x 10 L jugs
MCPA 300 Sodium salt (PCP# 14718)	Nufarm	300 g/L	Solution	2 x 10 L, 20 L jugs
MCPA 300 Sodium salt (PCP# 9858)	United Agri Products	300 g/L	Solution	2 x 10 L jugs

Crops, Staging and Rates

Crop	Stage	Rate	
Wheat (spring and durum), barley, spring rye	From the 3-leaf expanded to the early flag-leaf (shot blade) stage	500 amine: 0.45 L/acre 600 amine or ester: 0.42 L/acre	400 K salt: 0.53 L/acre 300 Na salt: 0.81 L/acre
Oats	From the 3 leaf to early flag leaf	500 amine or ester: 0.45 L/acre 600 amine or ester: 0.36 L/acre	400 K salt: 0.53 L/acre 300 Na salt: 0.81 L/acre
Winter wheat (WW) and fall rye (FR)	Spring: from the time growth commences until flag leaf stage	500 amine: 0.45 L/acre 600 ester: 0.42 L/acre	400 K salt: WW 0.61 L/acre, FR: 0.40 L/acre 300 Na salt: 0.81 L/acre
Flax (excluding solin)	5 cm in height to pre-bud stage. Apply at 5 - 10 cm in height for maximum crop tolerance	500 amine: 0.4 L/acre 600 amine: 0.34 L/acre; 600 ester: 0.28 L/acre	400 K salt: 0.65 L/acre 300 Na salt: 0.71 L/acre
Corn	As a broadcast spray up to 15 - 18 cm tall or 6-leaf stage. Directed spray using drop nozzles: up to 3 wks. before tasseling	500 amine or ester: 0.45 L/acre 600 amine only: 0.37 L/acre	400 K salt: 0.51 L/acre 300 Na salt: 0.61 L/acre

MCPA (cont'd)

Crop	Stage	Rate
Peas (field and canning)	Vine 10 - 18 cm long. For short stature determinate varieties apply at the early stage within this range	500 amine: 0.135 - 0.22 L/acre 600 amine only: 0.17 L/acre 400 K salt: not registered 300 Na salt: 0.36 L/acre
Forages (established)	Apply in the spring up to the shot blade stage	500 amine only: 0.45 L/acre
Seedling forage (not for grass production)	From the 3 leaf to early flag leaf	500 amine only: 0.45 L/acre
Pasture, rangeland, turf	Spring or fall	500 amine or ester: 1.41 L/acre 600 amine: 1.41 L/acre; 600 ester: 1.13 L/acre
Red clover (seedling and established)	Seedling: 1 - 3 trifoliolate stage Established: breaking of dormancy in the spring up to 7.5 cm	500 amine: 0.23 L/acre 600 amine only: 0.19 L/acre 400 K salt: not registered 300 Na salt: 0.36 L/acre
Cereals underseeded to alfalfa (not Flemish)	Apply when alfalfa is in the 1 - 3 trifoliolate stage	500 amine: 0.23 L/acre 600 amine only: 0.19 L/acre 400 K salt: not registered 300 Na salt: 0.4 L/acre
Cereals underseeded to alsike, ladino and red clover	Apply when clover is in the 1 - 3 trifoliolate stage	500 amine: 0.28 L/acre 600 amine or ester: not registered 400 K salt: not registered 300 Na salt: 0.4 L/acre
Fairways and lawns	Apply early in the summer	500 amine: 0.4 - 1.0 L/acre 600 amine or ester: not registered 400 K salt: not registered 300 Na salt: 0.4 L/acre

Weeds, Staging and Rate

Apply when weeds are in 2 - 4 leaf stage. Use lower rate when weeds are small and growing conditions are good; use higher rate when weeds are in dry or cool conditions or under heavy infestation.

Weed listing and rate range for individual formulations may differ slightly; please consult the product label for specific weed controlled and rates for each formulation.

Susceptible weeds	Harder to control weeds	Top growth control only
MCPA Amine 500 @ 0.28 - 0.45 L/acre MCPA Ester and amine 600 @ 0.24 - 0.36 L/acre MCPA 400 K @ 0.61 - 0.67 L/acre MCPA 300 Na @ 0.5 - 0.81 L/acre	MCPA amine 500 @ 0.45 - 0.71 L/acre MCPA amine and ester 600 @ 0.42 - 0.61 L/acre MCPA 400 K @ 0.71 - 0.81 L/acre MCPA 300 Na @ 0.81 - 1.1 L/acre	MCPA amine 500 @ 0.45 - 0.71 L/acre MCPA amine and ester 600 @ 0.42 - 0.61 L/acre MCPA 400 K @ 0.71 - 0.81 L/acre MCPA 300 Na @ 0.81 - 1.1 L/acre
bluebur burdock (before 4 leaf stage) cocklebur common plantain flixweed (seedlings) Indian mustard kochia lamb's-quarters prickly lettuce ragweed Russian pigweed shepherd's-purse stinkweed vetch wild radish wild mustard wormseed mustard wild sunflower	Weeds listed under susceptible plus annual sow-thistle biennial wormwood common chickweed curled dock (before the 4-leaf stage) daisy fleabane dandelion goat's-beard hairy galinsoga hawkweed heal-all hempnettle (before the 4-leaf stage) knotweed (before the 4-leaf stage) kochia	blue lettuce Canada thistle corn spurry chicory dog mustard field bindweed field horsetail gumweed hedge bindweed hoary cress lady's-thumb leafy spurge perennial sow-thistle Russian knapweed Russian thistle smartweed tartary buckwheat teasel wild buckwheat wormwood

MCPA (cont'd)

Tank Mixes**Barley**

MCPA 500 amine (400 mL/acre) + Sencor (111 - 202 mL/acre)

MCPA 500 amine (344 mL/acre) + Banvel (93 mL/acre)

MCPA K-salt (404 mL/acre) + Banvel II (92 mL/acre)

MCPA K-salt (270 - 550 mL/acre) + Pardner (404 mL/acre)

Wheat

MCPA 500 amine (400 mL/acre) + Sencor (111 - 172 mL/acre)

MCPA 500 amine (344 mL/acre) + Banvel (93 mL/acre)

MCPA K-salt (404 mL/acre) + 117 mL/acre)

MCPA K-salt (270 - 550 mL/acre) + Pardner (404 mL/acre). Note: Do not exceed 270 mL/acre rate of MCPA K-salt in winter wheat using this tank mixture.

Oats

MCPA K-salt (270 - 550 mL/acre) + Pardner (404 mL/acre)

Cereals underseeded to alfalfa and bird's-foot trefoil

MCPA 500 amine (28 mL/acre) + Embutox (505 mL/acre)

Application Information

How to Apply: Ground and air.

Water Volume: Cereals, flax, pastures, forage grasses: 40 L/acre; Peas: minimum of 61 L/acre; Pasture, rangeland and turf: 180 L/acre; Cereals underseeded to legumes: 61 - 81 L/acre.

Application Tips

Best weed control occurs when daytime temperatures are above 21°C and nighttime temperatures are at 10°C. Do not spray when air temperature is above 27°C. Extremely hard water may reduce performance. When applying to flax under hot and humid conditions, some crop injury and delay in maturity may result. Spraying in the evening and/or increased volumes of water (40 or more litres per acre) may reduce the risk of flax injury.

How it Works

A systemic, absorbed by leaf and stem surfaces and translocated to the actively growing regions. MCPA disrupts cell division, causing abnormal growth response, thereby affecting respiration and food reserves.

Expected Results

Weeds start to twist between 2 - 20 days after spraying, depending on weather conditions, formulation and nature of weeds. Following the twisting and bending, plants will turn brown, and then die. Only emerged weeds will be controlled.

Restrictions

Effect of Rainfall: Rain within 6 hrs of MCPA Na salt, or MCPA K-salt, 4 hrs of MCPA amine, and 2 hrs of MCPA ester application will decrease weed control.

Grazing: Do not graze or cut for green feed until 7 days after spraying.

Re-cropping: No restrictions the year after application.

Environmental Precautions

MCPA is toxic to aquatic organisms and non-target terrestrial plants.

Leaching: MCPA can readily leach from soil, resulting in contamination of groundwater particularly in areas where soils are permeable (e.g. sand, loamy sand and sand loam soils) and/or the depth to the water table is shallow.

Toxicity

Moderate acute mammalian toxicity. May cause burning upon contact with skin and eyes, and it can be absorbed through the skin.

Storage

If frozen, warm to 5°C and mix well before using.

Mecoprop



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Mecoprop - P (PCP # 27891)	United Agri Products	Mecoprop: 150 g/L	Liquid	10 L

Crops and Staging

Crop	Staging	Remarks
Barley, oats and wheat	3-leaf expanded stage until the early flag leaf (shot-blade)	Apply under good growing conditions. Do not spray on grain underseeded with legumes.

Weeds Controlled and Staging

In barley, oats and wheat

Rate: small weeds (seedlings) - 2.2 L/acre. Mature weeds: 3.4 L/acre.

Apply to weeds from 2 - 4 leaf stage

black medick	corn spurry	plantain
Canada thistle (top growth only)	lamb's quarters	volunteer clover
chickweed	plantain	wild mustard
cleavers		

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: Cereals: 80 - 120 L/ac.

Application Tips

Recommended water volume is essential for optimum weed control. Cold weather and drought may cause a delay in weed control action.

How it Works

A systemic that disrupts the plant's translocation system causing the accumulation of plant food in the shoots and subsequent starvation of the roots.

Expected Results

Weeds: Leaf curling and stem twisting should be visible within 4 - 5 days after spraying. Weeds should be dead within 3 - 4 weeks of application.

Crop: Deformed heads, missing florets and twisted awns could result if recommendations are not followed or if crop is under stress conditions.

Restrictions

Rainfall: Rain within 4 - 6 hours will reduce effectiveness.

Grazing: Do not graze or feed treated crops to livestock.

Re-cropping: No restrictions.

Environmental Precautions

Do not apply directly to water. Do not apply when weather conditions favour drift from target areas.

Leaching: Readily leached from soil. In dry soils, it has a longer residual.

Toxicity

Moderate oral toxicity. Acute oral LD₅₀ (rat): 650 mg/kg.

Storage

Store above 0°C. If stored for 1 year or longer, shake well before using.

Muster Toss-N-Go

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Muster (PCP # 23569)	E.I. duPont Canada	Ethametsulfuron-methyl: 75%	Dry flowable	320 package (4 x 80 gram bags)

320 gram package (4 x 80 gram water soluble pouches will treat 26.7 - 40 acres).

Crops, Staging and Rate

Crop	Staging	Rate
Canola, including rapeseed	2 leaf to beginning of bolting	Muster @ 8 g/acre or 12 g/acre
brown condiment mustard, oriental mustard	4 leaf to late rosette stage	Muster @ 8 g/acre

Must use a surfactant with Muster. Use Agral 90, or Ag-Surf, or Citowett Plus, or Super Spreader.

Caution: Application prior to the 2-leaf stage of canola or 4-leaf stage of brown condiment mustard and oriental mustard (condiment and oilseed types), or to sandy soil or low soil organic matter may increase the severity of injury.

Weeds Controlled, Stage and Rate

Apply from 2 - 6 leaf stage.

Rate: Muster @ 8 g + non-ionic surfactant @ 0.2% v/v

flixweed (spring seedlings)	hemp-nettle	wild mustard
stinkweed (suppression) (1 - 4 leaf)	green smartweed	

Rate: Muster @ 12 g + non-ionic surfactant @ 0.2% v/v

Above weeds plus suppression of redroot pigweed and control of stinkweed

Tank Mixes

Tank mix partner	Muster + tank mix partner rate	Additional weeds controlled
Canola, brown and oriental mustard		
Assure II	Muster @ 8 - 12 g/acre + Assure II @ 150 - 200 mL/acre + SureMix @ 0.5 % v/v	Grassy weeds (barnyard grass, green foxtail, quackgrass, volunteer cereals, wild oats) plus Muster susceptible weeds
Canola only		
Poast Ultra	Muster @ 8 - 12 g/acre + Poast Ultra II @ 130 - 190 mL/acre + Merge @ 0.75 - 1.0% v/v	Grassy weeds (barnyard grass, green foxtail, quackgrass, volunteer cereals, wild oats) plus Muster susceptible weeds

Application Information

With: Apply with ground sprayers. Do not apply by air.

Water volume: 40 L/ac.

Muster Toss-N-Go (cont'd)**Application Tips**

Good growing conditions enhance the activity of Muster following maximum foliar uptake and contact activity. Weed regrowth may occur in thin stands and where crops suffer from reduced vigour and under poor growing conditions.

How it Works

Absorbed by foliage and roots. Inhibits cell elongation.

Expected Results

Muster is an ALS inhibitor herbicide and thus rapidly inhibits the growth of susceptible weeds; however, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 to 3 weeks after application depending upon growing conditions and weed susceptibility. Degree of control and duration of effect depend on weed sensitivity, weed size, growing conditions, and spray coverage.

Restrictions

Rainfall: Rainfall 4 - 6 hours after application may reduce effectiveness. Environmental conditions that slow the drying of Muster on the foliage, such as high relative humidity, cool air temperature or cloud cover, may increase the time required.

Grazing: Do not graze or feed crop to livestock within 60 days of treatment.

Pre-harvest Intervals: Do not harvest within 60 days of treatment.

Re-cropping: Minimum interval is that from the last application of Muster to date of planting the rotational crop.

Interval Prior to Planting (months after application):

10 months	Spring wheat, durum wheat, barley, oats, flax
22 months	Canola, lentils, peas, fababeans, tame mustard, alfalfa, canary grass, dry beans, fescue, red clover
All other crops, field bioassay at 22 months.	

Note: Wherever Muster is used on land previously treated with Ally herbicide, read the rotational guidelines on both labels and follow the label with the longest interval stated for your situation.

Environmental Precautions

Muster Toss-N-Go is toxic to aquatic organisms and non-target terrestrial plants.

Runoff

Avoid contamination of aquatic or susceptible terrestrial habitats by runoff or leaching through the use of a buffer strip between the treated area and the sensitive areas. Avoid application of this product when heavy rain is forecast.

Leaching

The use of this chemical may result in contamination of groundwater, particularly in areas where soil pH > 7, soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Low acute toxicity. Acute oral LD₅₀ (rat) > 5,000 mg/kg.

Storage

Store in a cool, dry place.

Muster Gold II



Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Muster (PCP # 21555)	E.I. duPont Canada	Ethametsulfuron-methyl: 75%	Dry flowable	320 package (4 x 80 grams bags)
Assure (PCP # 25462)		Quizalofop P-Ethyl: :96 g/L	EC	10 L jug
Merge (PCP # 24702)	BASF Canada	Surfactant blend: 50%		

320 gram package (4 x 80 gram water soluble pouches will treat 26.7 - 40 acres).

Crops, Staging and Rate

Crop	Staging	Rate
Canola, including rapeseed	2 leaf to beginning of bolting	Muster @ 8 g/acre + Assure @ 200 mL/acre. + Merge @ 0.5% v/v

Weeds Controlled, and Stage

Weeds	Leaf stage
Grasses	
barnyard grass	2 leaf to early tillering
green foxtail	
volunteer barley	
volunteer wheat	
wild oats	prior to tillering
quackgrass (suppression)	2 - 6 leaf stage
Broadleaf weeds	
flixweed	Cotyledons to 6 leaf
green smartweed	
hemp-nettle	
stinkweed	
	1 - 4 leaf

Tank Mixes

None.

Application Information

With: Apply with ground equipment. Do not apply by air.

Water volume: Minimum of 40 L/ac.

Application Tips

Best results on wild oats if application is made prior to tillering. When very high weed seedling populations occur, larger seedlings may interfere with coverage of smaller seedlings, and control may be reduced. Weed regrowth may also occur without crop competitiveness due to thin stands and/or reduced vigour. Do not apply Muster Gold II to plants stressed by severe conditions such as drought, low fertility, saline soils, waterlogged soils, disease or insect damage as crop injury may result.

Muster Gold II (cont'd)**How it Works**

Assure II is a systemic herbicide that is rapidly absorbed and readily translocated from the treated foliage to the root system and growing points of the plant. Muster is absorbed by the foliage and roots. Inhibits cell elongation.

Expected Results

Broadleaf weed growth stops almost immediately. Grassy weeds show a reduction in growth and a loss of competitiveness. An early yellowing or browning of the younger plant tissues is followed by a progressive collapse of the remaining foliage. These results will generally be observed in 1 - 3 weeks, depending on the grass species treated and the environmental conditions. Poor results may be expected if there is improper mixing, timing or coverage, or when weeds are under stress.

Restrictions

Rainfall: Muster Gold II requires four to six hours of dry weather to allow Muster Gold II to be absorbed by weed foliage. Environmental conditions that slow the drying of Muster Gold II on the foliage, such as high relative humidity, cool air temperature or cloud cover, may increase the time required.

Grazing: Do not graze or feed crop to livestock within 60 days of treatment.

Pre-harvest Intervals: Do not harvest within 60 days of treatment.

Re-cropping: Minimum interval is that from the last application of Muster to date of planting the rotational crop.

Interval Prior to Planting (months after application):

10 months	Spring wheat, durum wheat, barley, oats, flax
22 months	Alfalfa, canary grass, canola, drybeans, fababeans, fescue, lentils, peas
All other crops, field bioassay at 22 months.	

Note: Wherever Muster is used on land previously treated with Ally herbicide, read the rotational guidelines on both labels and follow the label with the longest interval stated for your situation.

Environmental Precautions

Both Muster and Assure II are toxic to aquatic organisms. Avoid contamination of aquatic systems during application and when cleaning equipment.

Runoff: Avoid contamination of aquatic or susceptible terrestrial habitats by runoff or leaching through the use of a buffer strip between the treated area and the sensitive areas.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soil pH > 7, soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Muster: Low acute toxicity. Acute oral LD₅₀ (rat) > 5,000 mg/kg.

Assure II: Very low acute toxicity. Acute oral LD₅₀ (rat) > 5,000 mg/kg.

Storage

Store in a cool, dry place.

Nortron/Etho SC

Group 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Nortron (PCP # 17293)	Bayer CropScience	Ethofumesate: 480 g/L	Suspension concentrate	10 L jug
Etho SC (PCP # 28350)	United Agri Products			

Crops, Staging and Rate

Fall: Apply before ground freezes. Apply in a band on the soil surface.

Spring: Apply before seeding and shallowly (2.5 - 5.0 cm) incorporate or pre-emergence.

Crop	Soil type	Method of application	
		Broadcast	18 cm band/ 55 cm row
Sugar beet	Light soils	1.38 - 1.83 L/acre	0.40 - 0.64L/acre
	Medium soils (< 3 % OM)	1.83 - 2.73 L/acre	0.64 - 0.91 L/acre
	Heavy soils (> 3% OM)	2.73 - 3.32 L/acre	0.91 - 1.13 L/acre

Weeds Controlled and Stage**Pre-emergence**

barnyard grass	lamb's-quarters	shepherd's-purse	wild buckwheat (suppression)
foxtail	purslane	volunteer barley	wild oats
kochia	redroot pigweed	volunteer oats	
lady's-thumb	Russian thistle (suppression)	volunteer wheat	

Tank Mixes

Tank mixes only on medium textured soils with an organic matter content <3%. Do not use this mix on high organic soils or soils with sandy, loam sand or sandy loam soils.

Tank mix partner	Tank mix rate	Additional weeds controlled
Broadcast application		
Pyramin	Nortron/Etho @ 1.47 L/acre + Pyramin @ 2.12 L/acre	Pyramin susceptible weeds
18 cm band/55 cm row		
Pyramin	Nortron/Etho @ 0.49 L/acre + Pyramin @ 0.7 L/acre	Pyramin susceptible weeds

Application Information

With: May be applied with ground equipment. Do not apply by air.

Water volume: 44 - 222 litres per acre.

Application Tips

Apply Nortron before or at planting time and incorporate into the soil to a depth of 2.5 - 5.0 cm. Deeper incorporation may reduce effectiveness. Nortron may be applied pre-emergence at the time of planting or shortly after, but prior to weed emergence.

Incorporation equipment: Hooded-power or ground-driven rotary tillers, rolling cultivators and harrows are most effective for incorporating Nortron into the soil. Do not apply Nortron through soil injector shanks. All existing vegetative growth should be thoroughly worked into the soil before treatment. Do not allow spray mixture to stand in tank overnight.

How it Works

Uptake of ethofumesate occurs primarily via the emerging shoot as it passes upwards through treated soil; however, for certain broadleaf species, root uptake is more important. Ethofumesate is non-volatile, and in all cases, uptake occurs from aqueous solution.

Expected Results

Ethofumesate applied pre-plant incorporated with proper activation will normally not permit weed emergence. If emergence should occur, uptake has occurred; seedling will show loss of vigour and eventual death.

Restrictions

Rainfall: Normally 1.5 cm of rainfall is sufficient to activate Nortron. In areas where moisture can be marginal, incorporation is recommended.

Nortron/Etho SC (cont'd)

Grazing: Do not graze the treated crops or cut for hay; there are not sufficient data available to support such use.

Re-cropping: Do not rotate with any crops other than sugar beets for 12 months after application. Thorough tillage should precede the planting of crops other than sugar beets. If crop is lost due to climatic or soil conditions following application of Nortron, do not plant crops other than sugar beets in Nortron-treated land during the same season.

Do not retreat field with Nortron. Wheat and barley may be injured if planted following a dry sugar beet year.

Environmental Precautions

Nortron/Etho SC is toxic to aquatic organisms and non-target plants. Observe buffer zones of 1 metre for aquatic habitats and 2 meters for sensitive terrestrial habitats. Do not apply directly to water, and do not contaminate surface or groundwater by cleaning of equipment or disposal of wastes.

Runoff: Avoid runoff from treated areas into aquatic habitats.

Toxicity

Moderate to low acute toxicity. Acute oral LD₅₀ (rat) > 2,100 mg/kg. Causes eye or skin irritation.

Storage

Do not use or store near heat or open flames. Store Nortron in a cool place, above 0°C.



Caution Irritant

Nuance

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Nuance (PCP # 29468)	Cheminova	Tribenuron-methyl: 75%	Dry flowable: water disperable granule	320 g

Nuance is purchased alone but must be used in a mix with either 2,4-D ester or glyphosate.

Crops, Staging and Rate

Crop	Stage	Rate**
Barley* Wheat (including durum)*	Full 3-leaf stage to just before the flag leaf (shot blade)	Nuance: 4 grams/acre + 2,4-D ester LV 700: 250 mL/acre. Note: Do not add a surfactant.
Summerfallow	Winter annuals: fall rosettes and spring seedlings. Summer annuals: emergence, up to the early flowering	

* Do not apply to barley and wheat underseeded to legumes or grasses.

** Do not apply Nuance alone. Always add 2,4-D LV ester 700.

Weeds Controlled and Staging

Apply to young, emerged actively growing weeds that are less than 10 cm tall or across and before the crop canopy closes.

Nuance + 2,4-D LV ester 700

annual sunflower	kochia	Russian thistle	wild mustard
ball mustard	lamb's-quarters	shepherd's-purse*	wild radish
Canada thistle (top growth)	narrow-leaved hawk's-beard*	stinkweed*	wormseed mustard
cow cockle	prickly lettuce	sweet clover	
flixweed*	redroot pigweed	thyme-leaved spurge	
hare's-ear mustard	Russian pigweed	tumble mustard	
indian mustard		wild buckwheat** (1 - 3 leaf)	

* Fall rosettes and spring seedlings

** Suppression

Tank Mixes

Tank mix partner	Nuance + tank mix partner rate	Additional weeds controlled
Barley and wheat (including durum)		
Assert*	Nuance @ 4 g/acre + 2,4-D ester LV 700 @ 250 mL/acre + Assert @ 525 - 648 mL/acre	All weeds controlled by Nuance and 2,4-D plus wild oats
Puma¹²⁰ Super**	Nuance @ 4 g/acre + 2,4-D LV700 ester @ 250 mL/acre + Puma ¹²⁰ Super @156 mL/acre	All weeds controlled with Nuance and 2,4-D plus green foxtail (1 - 6 leaf stage)
Spring wheat and barley (excluding durum)		
Banvel II***	Nuance @ 4 g/acre + 2,4-D ester LV 700 @ 250 mL/acre + Banvel II @ 45 mL/acre	All weeds controlled by Nuance and 2,4-D plus Group 2 resistant kochia
Summerfallow and pre-seed		
Glyfos	Nuance @ 4 g/acre + 0.3 - 0.5 L/acre of Glyphos, Cheminova Glyphosate, Roundup Transorb, and Touchdown iQ. Use .336L/acre of Roundup Weathermax	See glyphosate listing for additional weeds controlled
Cheminova Glyphosate		
Roundup Transorb		
Roundup Weathermax		
Touchdown iQ		

* Use the low rate of Assert when the majority of wild oats are in the 1 - 3 leaf stage and the higher rate if wild oats are in the 4-leaf stage. Apply when the crop is in the full 3-leaf stage.

**Apply from the full 3-leaf stage to the 6-leaf + 3 tiller stage of wheat (including durum) and the full 3-leaf stage to the 5-leaf + 2 tiller stage of barley. For green foxtail control, apply at the 1-6 leaf (up to emergence of the 3rd tiller) stage.

***Apply the tank mix from the full 3-leaf stage to the 6-leaf + 3 tiller stage of wheat (excluding durum) and barley and to kochia plants that are 2.5 - 10 cm in height.

Application Information

With: Apply with ground equipment. Do not apply by air.

Water volume: 40 L/acre.

Application Tips

Wild oat herbicides require a 4 - 5 day interval before or after an application of Nuance. Effectiveness may be reduced if spray mixture remains in tank for more than 24 hours. When tank mixed with Assert, apply within 12 hours of mixing.

How it Works

Absorbed by foliage and roots, inhibits cell elongation.

Expected Results

Nuance stops growth of susceptible weeds immediately. However, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed susceptibility. Degree of control and duration of effect depend on weed sensitivity, weed size, spray coverage and growing conditions. Favorable growing conditions following treatment promote the activity of Nuance while cold, dry conditions delay the activity.

Restrictions

Rainfall: Nuance requires 4 - 6 hours of dry weather to be absorbed by weed foliage.

Grazing: Do not graze or feed to livestock within 30 days of application.

Re-cropping: A minimum of 2 months should be left between the application of this product and harvest or seeding of the next crop. The following crops can be seeded two months after application: canola, flax, lentils, and alfalfa.

Environmental Precautions

There is no available data on the product itself. However, the product should not be allowed to enter drains or watercourses or be deposited where it can affect ground or surface waters. The active ingredient, tribenuron-methyl

Nuance (cont'd)

technical, is considered to be toxic to many plants and non-toxic to fish, aquatic invertebrates, soil micro- and macro-organisms, birds, mammals and insects.

Toxicity

Low to moderate oral toxicity. Acute oral LD_{50} (rats) = > 2,000 mg/kg. Low to moderate dermal toxicity. May irritate eyes, nose, throat and skin.

Storage

Store in a cool dry place.



Warning Irritant

Odyssey

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Odyssey (PCP # 25111)	BASF Canada	Imazamox 35% + Imazethapyr 35%	Water dispersible granules	8 x 86.5 grams

One 8 x 86.5 pack treats 40 acres.

Note: The surfactant is not included in the package

Crops and Staging

Crop	Stage
CLEARFIELD canola	2 - 6 leaf stage
CLEARFIELD XCEED (<i>Brassica juncea</i>)	
CLEARFIELD lentils	1 - 6 above ground nodes (1 - 6 leaf)
Field peas	
Fenugreek (seed production)	1 - 4 leaf
Alfalfa (seedling or established grown for seed)	
Bird's-foot trefoil (seed production)	
Soybean	1 - 3 true leaves

Weeds, Rate and Staging

Grasses: 1 - 4 main stem leaves, until tillers are visible.

Broadleaf weeds: Cotyledons to 4 leaf stage, unless otherwise stated.

Odyssey @ 17.2 grams/acre + Merge @ 0.5% V/V (5.0 L/1,000 L spray solution) will control the following weeds

Grassy weeds

barnyard grass
green foxtail
persian dandelion

volunteer barley
volunteer oats
volunteer wheat (except CLEARFIELD)

wild oats

Broadleaf weeds

chickweed
cleavers (up to 4 whorls)
flixweed
green smartweed
hemp-nettle*
kochia**
lamb's-quarters***

redroot pigweed
Russian thistle****
shepherd's purse
stinkweed
stork's bill
volunteer canola (non-imazethapyr tolerant canola only)

volunteer tame mustard (not XCEED varieties)
wild buckwheat*
wild mustard

* Suppression in field peas and imazethapyr and imazamox tolerant lentils ** Not controlled in CLEARFIELD lentils; suppression in field peas and CLEARFIELD canola *** Suppression in field peas, CLEARFIELD lentils, and CLEARFIELD canola **** Suppression in CLEARFIELD lentils

Note: Prairie-wide surveys of kochia fields have found approximately 90% of kochia populations that are Group 2 herbicide resistant. Without testing to confirm, assume the kochia in your field is resistant and will not be controlled by this product alone.

Tank Mixes

Tank mix partner	Odyssey + tank mix partner rate	Additional weeds controlled
CLEARFIELD canola		
Lontrel*	Odyssey @ 17.3 g/acre + Lontrel @ 170 - 227 mL/acre	All weeds controlled by Odyssey + Canada thistle.
CLEARFIELD lentils and field peas.		
Equinox	Odyssey @ 17.3 g/acre + Equinox @ 67 - 101 mL/acre + Merge @ 0.5% V/V	All weeds controlled by Odyssey + quackgrass, volunteer CLEARFIELD wheat, green foxtail, volunteer barley, volunteer wheat and wild oats. Use a higher rate for control of quack grass or when weed densities are high and overlapping.

* Apply when Canada thistle plants are actively growing. Lontrel at 169 mL/acre will provide top growth control of Canada thistle for 6-8 weeks, while the 226 mL/acre rate will provide season long control of top growth.

Application Information

With: Apply with ground equipment only.

Water volume: 40 L/acre.

Application Tips

Water soluble bags will dissolve better when kept intact; do not split bags. If agitation is stopped for more than 5 minutes, re-suspend spray solution by full agitation prior to commencing spraying again. Do not spray Odyssey if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Initial transient crop yellowing may be observed after application, but this is outgrown and should not affect yield.

How it Works

Absorbed by foliage and roots. Disrupts plant metabolism causing growth to stop. Works best under good growing conditions. Residual activity of small seeded, shallow germinating flushing weeds (not wild oats) expected until crop flowering. Moist conditions result in better residual control.

Expected Results

Susceptible weeds stop growing within 24 - 48 hours. Yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks.

Restrictions

Rainfall: Do not apply if rain is expected in 3 hours.

Grazing: Do not graze treated canola, CLEARFIELD XCEED canola or cut for hay; sufficient data are not available to support such uses. Field peas treated with Odyssey may be fed to livestock 30 days after application.

Pre-harvest Interval: After 60 days, bird's-foot trefoil, canola, field peas, fenugreek (for seed uses only) and lentils can be harvested. Only apply Odyssey once per year.

Re-cropping: Barley, CLEARFIELD canola, canary seed, chickpeas, durum wheat, field corn, field peas, lentils (incl. CLEARFIELD lentils), oats, spring wheat and XCEED can be grown safely the year following an application. Flax, non-CLEARFIELD canola and sunflowers can be grown in the second year after an Odyssey application (e.g. if you used Odyssey in 2010, you can grow non-CLEARFIELD canola in 2012). For other crops, call BASF at 1-877-371-2273. Conduct a field bioassay the year before growing any crops other than those listed above. In case of crop failure, replant only to CLEARFIELD canola or field peas.

Environmental Precautions

Odyssey is highly toxic to non-target plants. A buffer zone of 14 metres is required between the downwind point of direct application and the closest edge of sensitive terrestrial or aquatic habitats. DO NOT contaminate drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Odyssey (cont'd)

Runoff: Avoid runoff from treated areas into aquatic habitats.

Toxicity

Low acute toxicity. Acute oral LD₅₀ (rats) = 5,000 mg/kg. Non-toxic to fish, birds and bees.

Storage

Store at temperatures above 5°C. Keep unused water soluble bags in resealed, original container. Keep packages dry at all times.



Warning Irritant

Odyssey DLX

Group 1, 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Odyssey (PCP # 25111)	BASF Canada	Imazamox 35% + Imazethapyr 35%	WDG	8 x 86.5 g
Equinox (PCP # 27603)		Topraloxydim: 200 g/L	EC	2.67 L jug
Merge (PCP # 24860)		Surfactant blend: 50%		8.1 L jug

One pack treats 40 acres.

Note: The surfactant is included in the package.

Crops and Staging

Crop	Stage
CLEARFIELD lentils	1 - 6 above ground nodes
Field peas*	1 - 6 above ground nodes (1 - 6 leaf)
CLEARFIELD Canola	2 - 6 leaf stage
CLEARFIELD XCEED canola	2 - 6 leaf stage

Weeds and Staging

Grasses: Barnyard grass and Persian dandel: 1 - 4 main stem leaves, until tillers are visible.

Green foxtail, Wild oats, Volunteer cereals - Grasses: 1 - 6 main stem leaves, including 2 tillers.

Broadleaf weeds: Cotyledons to 4 leaf stage, unless otherwise stated.

Rate: Odyssey: 17 g/ac + Equinox EC: 67 mL/ac + Merge: 0.5% v/v (5.0 L/1,000 L spray solution).

Grasses

barnyard grass
green foxtail
Persian dandel

volunteer barley
volunteer oats
volunteer wheat (including CLEARFIELD varieties)

wild oats

Broadleaf weeds

chickweed
cleavers (up to 4 whorls)
flixweed
green smartweed
hemp-nettle*
kochia**
lamb's-quarters***

redroot pigweed
Russian thistle****
shepherd's purse
stinkweed
stork's bill
volunteer canola (non-imazethapyr tolerant
canola only)

volunteer tame mustard (not XCEED
varieties)
wild buckwheat*
wild mustard

* Suppression in field peas and imazethapyr and imazamox tolerant lentils

** Note: 90% of surveyed fields in Alberta have Group 2 herbicide resistant kochia. Assume kochia in your field is resistant and another herbicide group will need to be used to control kochia. Not controlled in CLEARFIELD lentils; suppression in field peas and CLEARFIELD canola

*** Suppression in field peas, CLEARFIELD lentils, and CLEARFIELD canola

**** Suppression in CLEARFIELD lentils.

Tank Mixes

None registered.

Application Information

With: Apply with ground equipment only.

Water volume: 40 L/acre.

Application Tips

Water soluble bags will dissolve better when kept intact; do not split bags. If agitation is stopped for more than 5 minutes, re-suspend spray solution by full agitation prior to commencing spraying again. Do not spray Odyssey DLX if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Apply when weeds are small and actively growing, soil moisture is good and the crop is small enough to permit through spray coverage. During periods of stress, plants are not actively growing and reduced weed control or crop injury may result. When grasses are stressed due to drought, flooding, hot or prolonged cool temperatures (15°C or less) or coverage is inadequate, unsatisfactory control may result. Initial transient crop yellowing may be observed after application, but this is outgrown and should not affect yield.

How it Works

Absorbed by foliage and roots. Disrupts plant metabolism causing growth to stop. Works best under good growing conditions. Residual activity of small seeded, shallow germinating flushing weeds (not wild oats) expected until crop flowering. Moist conditions result in better residual control.

Expected Results

Odyssey causes susceptible weeds to stop growing within 24 - 48 hours. Yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks. Equinox is a systemic herbicide that causes growth to cease within 48 hours. Young leaves will turn yellow within 5 - 10 days; some grasses will then turn reddish. Necrotic spots will form on grass leaves.

Restrictions

Rainfall: Do not apply if rain is expected within 3 hours.

Grazing: Do not graze treated peas 60 days after application.

Pre-harvest Interval: After 60 days, field peas, CLEARFIELD canola and CLEARFIELD lentils can be harvested.

Re-cropping: Barley, CLEARFIELD canola, canary seed, chickpeas, durum wheat, field corn, field peas, lentils (incl. CLEARFIELD lentils), oats, and spring wheat can be grown safely the year following an application. Flax, non-CLEARFIELD canola and sunflowers can be grown in the second year after an Odyssey application (e.g. if you used Odyssey in 2010, you can grow non-CLEARFIELD canola in 2012). For other crops, call BASF at 1-877-371-2273. Conduct a field bioassay the year before growing any crops other than those listed above. In case of crop failure, replant only to CLEARFIELD canola or field peas.

Environmental Precautions

Odyssey is highly toxic to non-target plants. A buffer zone of 14 metres is required between the downwind point of direct application and the closest edge of sensitive terrestrial or aquatic habitats. DO NOT contaminate water supplies or aquatic habitats by application or cleaning of equipment or disposal of wastes.

Runoff: Avoid runoff from treated areas into aquatic habitats.

Toxicity

Low acute toxicity. Acute oral LD₅₀ (rats) = 5,000 mg/kg. Non-toxic to fish, birds and bees.

Storage

Store at temperatures above 5°C. Keep unused water soluble bags in resealed, original container. Keep packages dry at all times.

Optica Trio

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Optica Trio (PCP# 29662)	Nufarm UK Ltd Distributed by UAP Canada	MCPA, 160 g/L Dichlorprop-P, 310 g/L Mecoprop-P, 130 g/L	Solution	2 x 10

20 - 40 acres treated per case.

Crops and Staging

Crop	Staging
wheat (spring, durum) oats barley winter wheat	2-5 leaf stage for all crops For Winter Wheat Apply in spring before the crop is more than 30 cm in height leaf extended

Note: Application made later than the recommended timing may result in shortening of the straw (particularly under stress conditions)

Weeds, Rate and Staging

Weeds	Rate
stinkweed, wild mustard, lambs quarters, volunteer canola	0.5 litres per acre
pigweed (redroot), common chickweed, kochia, common ragweed, wild buckwheat	0.5-1 litres per acre
cleavers - spray in 1-2 whorl stage	0.75-1 litres per acre
Canada thistle - top growth only	1 litre per acre

Tank Mixes

Optica Trio can be tank mixed with Ladder 240 EC, Horizon 240 EC or Signal and Everest Solupak 70 DF for wild oat and green foxtail control in wheat only. Do not use these tank mixes on barley or oats.

Application Information

Use 20-80 litres of water per acre with ground sprayers. Do not apply by air.

Application Tips

Fill tank ½ full and add tank mix partner if applicable, then fill tank ¾ full and add Optica Trio herbicide. Maintain gentle agitation while mixing and spraying in the field.

How it Works

Optica Trio is a systemic, post emergence selective herbicide.

Expected Results

Weeds will start to twist shortly after application. Plant growth stops and plants turn brown and die.

Restrictions

Do not permit lactating dairy animals to graze treated fields within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. Do not harvest forage or cut for hay with 7 days of application. Minimum plant-back interval of 30 days.

Rainfall: Optica Trio is rainfast once allowed to dry on leaves. Do not apply if rain is expected within the hour.

Re-cropping: No cropping restrictions for Optica Trio applied alone for the following crop year.

Environmental Precautions

Toxic to aquatic organisms and non-target, terrestrial plants. Observe buffer zones of 1 metre from aquatic habitats and 2 metres from sensitive terrestrial habitats.

Toxicity

MCPA: Acute oral LD₅₀ (rats) = 700mg/kg

Dichlorprop-P: Acute oral LD₅₀ (rats) = 926 mg/kg

Mecoprop-P: Acute oral LD₅₀ (rats) = 650 mg/kg

Storage

Keep from freezing.



Warning Poison

Pardner/Koril/Bromotril/Brotex

Group 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Pardner (PCP #18001)	Bayer CropScience	Bromoxynil: 280 g/L	Emulsifiable concentrate	8 L jug
Koril (PCP # 25341)	Nufarm Agriculture	Bromoxynil: 235 g/L		9.7 L jug
Bromotril 240 EC (PCP # 28276)	MANA Canada	Bromoxynil: 240 g/L		
Brotax 240 (PCP # 28519)	IPCO			

Crops, Staging and Rate

Check label for registered crop uses. Not all products are registered on all listed crops.

Crop	Staging	Rate/acre	
		Pardner	Koril/Bromotril/Brotex
Barley, oats, spring wheat (including durum), triticale	2 leaf to early flag	405 - 485 mL	487 - 567 mL
Winter wheat	Fall: 2 - 4 leaf Spring: first growth to early flag leaf	405 - 485 mL	487 - 567 mL
Corn	4 - 8 leaf	405 - 485 mL	487 - 567 mL
Canaryseed (seed production)	3 - 5 leaf	405 mL	487 mL
Seedling alfalfa	2 - 6 trifoliate leaf	405 mL	487 mL
Established alfalfa (seed production)	From time growth begins until alfalfa is 25 cm tall.	405 - 485 mL	487 - 567 mL
Fall rye	Spring only: time growth begins to the early flag leaf stage	405 - 485 mL	487 - 567 mL
Flax, including Solin	5 - 10 cm tall	405 mL	487 mL
Seedling grasses * (seed production)	2 - 4 leaf (establishment year only)	405 - 485 mL	487 - 567 mL
Forage millet and sorghum	At or beyond the 4 leaf stage and less than 20 cm in height.	405 mL	487 mL
Pearl millet** and sorghum		405 mL	487 mL
Pre-seed burndown (zero-tillage)	Apply according to weed stage	405 mL	487 mL

* Seedling grasses include: bromegrass, creeping fescue, meadow fescue, red fescue, orchard grass, reed canary grass, Russian wild rye, timothy, crested wheatgrass, intermediate wheatgrass, slender wheatgrass and tall wheatgrass.

**Registered with Pardner and Bromotril.

Pardner/Koril/Bromotril/Brotex (cont'd)**Weeds Controlled and Staging****Seedlings up to 4-leaf stage**

American nightshade	cocklebur
annual smartweed	common ragweed
bluebur	cow cockle

kochia (5 cm tall)
lady's-thumb
redroot pigweed*

Russian thistle (5 cm tall)
stinkweed
wild mustard

Seedlings up to 8-leaf stage

common groundsel	tame buckwheat
lamb's-quarters	tartary buckwheat

volunteer buckwheat
wild buckwheat

wild mustard

* Not controlled in alfalfa.

** Controlled with high rate only.

Tank Mixes

Tank mix partner	Pardner* + tank mix partner rate	Additional weeds controlled
Spring wheat, including durum and barley (not under-seeded to legumes)		
2,4-D	Rate: Bromoxynil @ 113 g active ingredient/acre + 2, 4-D @ 111 - 170 g active ingredient. Timing: 4 leaf to early flag leaf	Weeds controlled by Bromoxynil plus flaxweed, shepherd's purse, volunteer sunflower, and ball mustard.
Achieve Liquid + Turbocharge	Rate: Bromoxynil @ 113 g active ingredient/acre + Achieve Liquid @ 200 mL/acre + Turbocharge @ 0.5% V/V. Timing: 2 leaf until early flag leaf	Weeds controlled by Bromoxynil plus wild oats, volunteer oats, green foxtail, barnyard grass and Persian damel.
Avengo	Rate: Bromoxynil @ 113 - 136 g active ingredient/acre + Avengo @ 1.4 - 1.7 L/acre Timing: 2 leaf until 6 leaf	Weeds controlled by Pardner plus wild oats. Wild oats must be in the 3 - 5 leaf stage and broadleaf weeds in the seedling stage.
Avengo + MCPA	Rate: Bromoxynil @ 113 - 136 g/acre + Avengo @ 1.4 - 1.7 L/acre + MCPA @ 113 - 222 g active ingredient. Timing: 2 leaf until 6 leaf	Weeds controlled by Pardner + wild oats, flaxweed, shepherd's purse, scentless chamomile*, volunteer sunflower, volunteer canola, hemp-nettle, Canada thistle, perennial sow-thistle, ball mustard and wormseed mustard.
Everest + surfactant (not to be used on barley)	Rate: Bromoxynil @ 113 g/acre + Everest @ 17 g/acre + Agral 90 or AgSurf @ 0.25 % V/V. Timing: 1-leaf to 4-leaves on main stem, plus 2 tillers.	Weeds controlled by Pardner + wild oats (including Group 1 and Group 8 resistant biotype) and green foxtail (including Group 3 resistant biotype).
Horizon + Score	Rate: Bromoxynil @ 113 g/acre + Horizon @ 95 - 115 mL/acre + Score @ 0.8 - 1.0 % V/V. Timing: 2 leaf to flag leaf	Weeds controlled by Pardner + barnyard grass, Persian damel, green foxtail, and volunteer cereals.
MCPA	Rate: Bromoxynil @ 113 g/acre + MCPA @ 111 - 222 g active ingredient/acre. Timing: 2 leaf until early flag leaf	Weeds controlled by Pardner plus flaxweed, shepherd's purse, scentless chamomile*, volunteer sunflower, volunteer canola, hemp-nettle, Canada thistle, perennial sow-thistle, ball mustard and wormseed mustard.
Winter wheat		
2,4-D	Rate: Bromoxynil @ 113 g/acre + 2, 4-D @ 111 - 170 g active ingredient. Timing: 4 leaf to early flag leaf	Weeds controlled by Bromoxynil plus flaxweed, shepherd's purse, volunteer sunflower, and ball mustard.
Achieve Liquid + Turbocharge	Rate: Bromoxynil @ 113 g/acre + Achieve Liquid @ 200 mL/acre + Turbocharge @ 0.5% V/V. Timing: 2 leaf until early flag leaf	Weeds controlled by Bromoxynil plus wild oats, volunteer oats, green foxtail, barnyard grass and Persian damel.
MCPA	Rate: Bromoxynil @ 113 g/acre + MCPA @ 111 - 222 g active ingredient/acre. Timing: 2 leaf until early flag leaf	Weeds controlled by Pardner plus flaxweed, shepherd's purse, scentless chamomile*, volunteer sunflower, volunteer canola, hemp-nettle, Canada thistle, perennial sow-thistle, ball mustard and wormseed mustard.

Tank mix partner	Pardner* + tank mix partner rate	Additional weeds controlled
Oats, fall rye, canary seed, seedling forage grasses and flax		
MCPA	Rate: Bromoxynil @ 113 g/acre + MCPA @ 111-222 g active ingredient/acre.	Weeds controlled by Pardner plus flaxweed, shepherd's purse, scentless chamomile*, volunteer sunflower, volunteer canola, hemp-nettle, Canada thistle, perennial sow-thistle, ball mustard and wormseed mustard.
Corn		
Atrazine	Rate: Bromoxynil @ 113 g/acre/acre + MCPA @ 111-222 g active ingredient/acre.	
Banvel II (field corn only)	Rate: Bromoxynil @ 113 g/acre/acre + MCPA @ 111-222 g active ingredient/acre.	

Application Information

With: Apply with ground equipment or by air in wheat and barley only.

Water volume: Corn: 80 - 120 L/acre. All other crops: 40 L/acre. Air: wheat and barley 8 L/acre.

Application Tips

Avoid spraying crops during adverse growing conditions, especially drought, high temperatures (over 29°C) or in high humidity.

How it Works

A contact herbicide so good coverage is essential. Inhibits respiration and photosynthesis causing death.

Expected Results

Weeds turn brown and die within 3 - 5 days - more rapid under good growing conditions and when applied to seedling weeds. Poor results can be expected if weeds past 4 leaf stage, poor spray coverage or lower than recommended rate used. Injury to corn may occur if under stress.

Restrictions

Rainfall: Rainfall within 2 hours of application may reduce weed control.

Grazing: Wheat, barley, oats and seedling alfalfa - Do not use treated crops for grazing of livestock or green feed until 30 days after application. Do not cut treated crops for forage until 30 days after application. CAUTION: Do not graze other treated crops or cut for feed unless specified above; sufficient data are not available to support such use.

Re-cropping: None.

Environmental Precautions

Bromoxynil is moderately to highly toxic to aquatic organisms and non-target terrestrial plants. Avoid contamination of aquatic systems during application.

Runoff: Avoid contamination of aquatic areas as a result of runoff.

Toxicity

Moderate to high oral toxicity. Acute oral LD₅₀ (rat) = 368 mg/kg. Very toxic to fish. Intake of a large dose may cause convulsions, sudden collapse and coma. Can be absorbed through the skin.

Storage

Pardner/Koril/Bromotril/Brotex formulations will solidify at temperatures below -20°C, but will be usable again at temperatures above 0°C.

Payload



Caution Poison

Group 14

Formulations

Product	Company	Active ingredient	Formulation	Container size
Payload (PCP # 29232)	Valent Canada	Flumioxazin: 51.1%	Water dispersible granules	2.27 kg

Crops and Staging

Crop	Staging
Bare ground non-crop areas such as rail road beds, under guard rails, above ground pipelines	Pre-emergence
Bare ground parking and storage areas, plant sites, pumping stations and oil yards	
Bare ground areas of airports, brick yards, industrial plant sites, lumber yards and storage areas	
Bare ground around farm buildings and along fence rows	
Road surfaces and gravel shoulders	

Weeds Controlled, and Rates

Weed	Soil type	Rate
Common ragweed, dandelion, eastern black nightshade, green foxtail, green pigweed, hairy nightshade, lamb's-quarters, redroot pigweed	Coarse-textured, with <5% organic matter	113 g/acre
	Medium-textured, with > 5% organic matter	170 g/acre

Tank Mixes

Glyphosate product, present as isopropyl amine or potassium salt at 1.2 kg a.i./ha.

Application Information

With: Apply with ground equipment. Do not apply by air.

Water Volume: Apply in sufficient water for uniform coverage.

Application Tips

Do not apply to farm alleys or roads where traffic may result in treated dust settling onto crops or other desirable vegetation. Do not apply to soils that are susceptible to wind erosion. Do not make more than two applications per growing season.

How it Works

Payload controls weeds by inhibiting protoporphyrinogen oxidase, an essential enzyme required by plants for chlorophyll biosynthesis. Seedling weeds are controlled preemergence when exposed to sunlight following contact with the soil-applied herbicide. Payload offers residual control of susceptible grass and broadleaf weeds listed on the label and assists in the control of acetolactate synthase (ALS) resistant weeds. The length of residual control is dependent on the application rate as well as on rainfall and temperature conditions. Length of residual control will decrease as temperature and precipitation increase and on soils of high organic matter and/or high clay content.

Expected Results

Moisture is necessary to activate Payload in soil for residual weed control. Dry weather following applications of Payload may reduce effectiveness. However, when adequate moisture is received after dry conditions, Payload will

Payload (cont'd)

control susceptible germinating weeds. Payload may not control weeds that germinate after application but before an activating rainfall/irrigation or weeds that germinate through cracks resulting from dry soil.

Restrictions

Rainfall: Moisture is necessary to activate Payload in soil for residual weed control.

Grazing: Do not graze treated fields or feed treated forage or hay to livestock.

Environmental Precautions

Payload herbicide is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified on the label. Payload is also toxic to small wild mammals and certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland.

Runoff: Avoid contamination of aquatic areas through runoff.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Keep pesticide in original container. Store in a cool, dry, secure place. To prevent contamination, store this product away from food or feed.



Caution Poison

Poast Ultra

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Poast Ultra (PCP # 24835)	BASF Canada	Sethoxydim: 450 g/L	Emulsifiable concentrate	2 x 7.7 L jugs

Crops, Staging and Rate

No stage restriction.

Maximum application rate: 0.45 L/acre + Merge at 0.5% V/V

alfalfa	chickling vetch	lentils	sugar beet
alsike clover*	cicer milkvetch*	lupins	tree and shrubs consisting of
beans (white, kidney, pinto,	creeping red fescue (for seed	mustard	spruce, colorado spruce,
adzuki, faba, lima, mung)	production only)	potatoes	scots pine, douglas fir,
canola (including Roundup	dry field peas	sainfoin*	caragana, cedar, juniper,
Ready, Liberty Link and	fababeans	sunflower	green ash, lilac, buffalo berry,
CLEARFIELD canola)	flax (including low linoleic acid	sweet clover	sea-buckthorn, potentilla,
	varieties)		spirea, maple, walnut

Maximum application rate: 0.26 L/acre + Merge at 0.5% V/V

alsike clover**	coriander	sainfoin**
caraway	dill	solin
cicer milkvetch**	safflower	sweet clover**

Maximum application rate: 0.23 L/acre + Merge at 0.5% V/V

Tame buckwheat

Maximum application rate: 0.19 L/acre + Merge at 0.5% V/V

chickpeas

* Established stand

** Seedlings only

Poast Ultra (cont'd)**Weeds Controlled, Staging and Rate**

Weeds	Stage	Rate	
		Poast Ultra	Merge (v/v)
Barnyard grass, fall panicum, green foxtail, large crabgrass, Persian dandel, proso millet, volunteer corn, witchgrass, yellow foxtail	1 - 6 leaf	0.13 L/acre	0.5 - 1.0 %
Volunteer cereals (barley, oats, wheat), wild oats in canola, flax (low linolenic varieties) and peas	1 - 4 leaf	0.13 L/acre	
Volunteer cereals (barley, oats, wheat), wild oats (suppression)	1 - 6 leaf	0.19 L/acre	
Quackgrass suppression	2 - 5 leaf	0.19 L/acre	
Quackgrass control plus annual grasses listed above	1 - 3 leaf	0.45 L/acre	
Foxtail barley suppression plus annual grasses listed above	1 - 4 leaf	0.45 L/acre	

Note: Merge adjuvant is sold separately.

Tank Mixes

Tank mix partner	Poast Ultra + tank mix partner rate	Additional weeds controlled
Canola		
Lontrel 360	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Lontrel 360 @ 0.17 - 0.34 L/acre	Poast Ultra susceptible grassy weeds plus Canada thistle.
Muster	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Muster 8 - 12 g/acre	Poast Ultra susceptible grassy weeds plus flaxweed, hemp-nettle, redroot pig weed stinkweed, wild mustard.
Muster + Lontrel 360	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.4 L/acre + Muster 8 g/acre + Lontrel 360 @ 0.17 L/acre	Poast Ultra susceptible grassy weeds plus Canada thistle plus above weeds.
Liberty Link canola		
Liberty 150 SN	Poast Ultra @ 0.09 L/acre + Merge @ 0.4 L/acre + Liberty 150 SN @ 1.08 L/acre	Poast Ultra susceptible grassy weeds plus Liberty susceptible weeds.
Flax		
Buctril M	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Buctril M @ 0.4 L/acre	Poast Ultra susceptible grassy weeds plus Bromoxynil susceptible weeds.
Logic M	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Logic M @ 0.5 L/acre	
MCPA ester	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + MCPA ester 500 @ up to 0.45 L/acre	
Lontrel 360	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Lontrel 360 @ 0.23 - 0.34 L/acre	Poast Ultra susceptible grassy weeds plus Canada thistle.
Lontrel 360 + MCPA	Poast Ultra @ 0.13 - 0.19 + Merge @ 0.75 - 1.0 % V/V + Lontrel 360 @ 0.23 - 0.34 L/acre + MCPA ester 500 @ 0.34 - 0.45 L/acre	Poast Ultra susceptible grassy weeds plus Canada thistle and MCPA susceptible weeds.
Field peas		
Pursuit	Poast Ultra @ 0.19 L/acre + Merge @ 0.4 L/acre + Pursuit @ 40 mL/acre	Chickweed, stinkweed, cleavers, hemp-nettle, volunteer canola (non-CLEARFIELD), redroot pigweed, wild buckwheat, smartweed, wild mustard.

Application Information

With: Apply with ground equipment or by air.

Poast Ultra (cont'd)

Water volume: Ground: 20 - 45 L/ac. Dense foliage, heavy infestations and for quackgrass control: 45 - 80 L/ac. Air: 10 - 20 L/ac.

Application Tips

For optimum control of grassy weeds, when grasses are actively growing, there is good soil moisture and crop is small enough to permit thorough spray coverage. Grasses growing in less than ideal conditions are more difficult to control. Do not spray Poast Ultra if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Escapes or re-tillering may occur under prolonged stress conditions or low fertility. Do not apply on grasses stressed longer than 20 days due to lack of moisture as unsatisfactory control can result.

Quackgrass Control: Apply when quackgrass is actively growing up to the 3 leaf stage (8 to 12 cm in height). Cultivation is necessary prior to spraying to stimulate even quackgrass growth and to obtain control. Where poor soil fertility (i.e., low nitrogen) exists, quackgrass control may not be satisfactory.

How it Works

Poast Ultra is a contact and a systemic herbicide. Absorbed primarily by foliage and translocated to the growing points. Inhibits formation of fatty acids in these tissues. Thorough coverage of the foliage is important for consistent grass control.

Expected Results

Susceptible grasses stop growing immediately, gradually turn yellow and then brown. The time required for complete control is normally 7 - 21 days (annual grasses). Control of quackgrass develops more slowly than control of annual grasses. Poast Ultra is translocated through the quackgrass plant to the rhizomes and kills actively growing rhizome buds, as well as above ground vegetation. Dormant rhizome buds will remain unaffected by the spray and regrowth can occur from these buds. The regrowth will not be significant until 6 - 8 weeks after treatment, depending on growing conditions, crop cultivation practices and crop competition.

Restrictions

Rainfall: Rainfall within one hour of application may reduce the weed control.

Grazing: Do not graze the treated crop or cut for hay; sufficient data are not available to support such use. Forage legumes indicated in the label may be cut for hay provided pre-harvest intervals are followed

Re-entry: Do not enter or allow entry into treated areas for 12 hours.

Pre-harvest Intervals:

Crop	Pre-harvest interval	Crop	Pre-harvest interval
Alfalfa	70 days	Forage legumes*	30 days
Beans, snap	15 days	Lentils and chickpeas	65 days
Buckwheat	85 days	Lupin	80days
Canola	70 days	Mustard	76 days
Chickling vetch	70 days	Potato	80 days
Dry common bean	80 days	Safflower	90 days
Dry peas	60 days	Solin	86 days
Fababeans	70 days	Sunflower	105days
Flax	60 days		

*Forage legumes includes Alsike clover, cicer milkvetch, sainfoin and sweet clover.

Re-cropping: A plant-back interval of 30 days is required for all crops other than those listed on the label.

Environmental Precautions

Poast Ultra is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified on the label. Avoid contamination of aquatic systems during applications.

Runoff: Avoid runoff from treated areas into aquatic habitats.

Poast Ultra (cont'd)**Toxicity**

Low acute toxicity. Acute oral LD₅₀ (rat) = > 4,000 mg/kg.

Storage

Store product in a cool, dry place. Freezing will not reduce effectiveness.

Prepare/Pre-Pare Complete/Pace

Group 2, 9

Formulations

Product	Company	Active ingredient	Formulation	Container size
Prepare (PCP# 29500)	Arysta LifeScience Canada Ltd. (Prepare Complete packaged and distributed by Viterro)	Flucarbazone sodium: 70%	Water dispersable granules	Pre-prepare: 696 g/L Pre-prepare Complete: 522 g/L
StartUp (PCP# 29498)	Monsanto Canada (packaged and distributed by Viterro)	Glyphosate: 540 g/L as a potassium salt	Solution	2 x 10 L jugs
Pace (Prepare (PCP# 29500))	Arysta LifeScience Canada Ltd.	Flucarbazone sodium: 70 %	Water dispersable granules	8 X 696 g
Traxion (PCP# 29201)	Syngenta Crop Protection Canada	Glyphosate: 500 g/L		461 L

One container will treat 60 acres

Crops and Staging

Crop	Stage	Rate
Spring wheat (excluding durum)	Pre-plant, post-plant pre-emergence	Pre-Pare: 8.7 g/acre
		StartUp: 0.33 L/acre
		Pace: 8.7 g/acre
		Traxion: 0.72 L/acre

Note: Pre-Pare/Pre-Pare Complete/Pace can be applied up to 1 week as a preplant or postplant preemergence application in spring wheat (excluding durum wheat)

Weeds Controlled and Staging

Weeds	Growth stage
Up to 15 cm high	
wild oats, green foxtail, volunteer cereals, volunteer flax, canola, wild mustard, lady's-thumb, stinkweed, flaxweed, giant foxtail, Persian dandel, downy brome, chickweed, cleavers, lamb's quarters, kochia, redroot pigweed, hemp nettle, Russian thistle, common ragweed, cow cockle, narrow-leaved hawk's-beard, shepherd's-purse	Under 8 cm tall
Weeds Suppressed	
Canada thistle, foxtail barley	

Tank Mixes

None.

Application Information

How to Apply: Ground Application only. Do not apply by air.

Water Volume: 22.5 - 45L/acre

Apply to actively growing weeds. Pre-Pare Complete/Pace herbicides can be applied up to one week prior to planting, prior to postplanting and prior to crop emergence in spring wheat (excluding durum wheat). The maximum rate of glyphosate applied when tank mixed with Pre-Pare 70 WDG is 182 g active ingredient/acre.

How it Works

Flucarbazone sodium is a systemic herbicide that is absorbed by both leaves and roots and moves rapidly to the growing point of the plant. StartUp/Traxion are non selective systemic herbicides that move through the foliage into the roots, resulting in plant mortality.

Expected Results

Growth of susceptible weeds stops soon after application of Pre-Pare/Pre-Pare Complete/Pace. Symptoms of Pre-Pare include discolouration (yellowing, reddening, and purpling), with complete control taking up to 1-2 weeks. Annual weeds susceptible to StartUp/Traxion will wilt and yellow with 2-4 days. Perennial weeds will wilt and yellow within 7-10 days.

Restrictions

Rainfall: Do not apply if rainfall is expected within 1 hour of application.

Grazing: Do not graze treated fields or use green crop for feed.

Pre-harvest Interval: 80 days.

Re-cropping Restrictions: The following crops may be planted 11 months after an application of Pre-Pare/Pre-Pare Complete/Pace.

Black Soil Zone: Barley, canola (all varieties), durum wheat, field beans, field peas*, flax, spring wheat

Brown Soil Zone: Spring wheat

Dark Brown Soil Zone: Barley, canola (all varieties), durum wheat, field peas*, flax, spring wheat

Gray Wooded Soil Zone: Barley, canola (all varieties), field peas*, spring wheat

* Field peas can be successfully grown the year following an Pre-Pare/Pre-Pare Complete/Pace application providing the following three criteria are all met:

1. Soil pH must be below 7.5.
2. Organic Matter content must be above 4%.
3. Precipitation must be equal to or above the 10 year average (minimum 100 mm within 60 days of application in year of application).

Rotational crops can be adversely affected if rainfall is below normal (10 year average) during the year of application. Use certified seed and good agronomic practices to reduce the effect on rotational crops.

Pre-Pare/Pace applications to eroded knolls in the Dark Brown and Black Soil zones with low OM (less than 2%) and high pH (greater than 7.5) or to Gray Wooded soils with highly variable soil texture and organic matter may result in delayed development or reduced yield of rotational crop.

Toxicity

Pre-Pare and StartUp have a very low acute mammalian toxicity. Pre-Pare has an acute oral LD₅₀ (rats) = >5,000mg/kg. StartUp has an acute oral LD₅₀ (rats) = 4,320 mg/kg. Traxion has an acute oral LD₅₀ (rats) > 5,000 mg/kg. It is non-toxic to bees, birds and fish.

Storage

Store in cool, dry place.

PrePass



Caution Poison

Group 4, 9

Formulations

Product	Company	Active ingredient	Formulation	Container size
PrePass A (PCP# 27395)	Dow AgroScience	Florasulam SC: 50 g/L	Suspension concentrate	1.6 L jug, 4 x 8 L jug
PrePass B (PCP# 27394)		Glyphosate: 356 g/L	Solution	2 x 10 and 4 x 100 L

Acres to Treat

PrePass A: 1.6 L jug will treat 40 acres. PrePass B: 2 x 10 L jugs will treat 40 acre.

Crops and Timing

Crop	Timing
Pre-seed weed burn-down	Apply prior to planting barley, oats or wheat to control emerged labelled weeds.
Summerfallow	Apply for control of labelled weeds.
Fall stubble applications	Apply in the fall to control annual broadleaf weeds and grasses prior to spring seeding of wheat (including durum), barley and oats.

Weeds Controlled, Rate and Timing

Rate: PrePass A: 40 mL/acre. PrePass B: 500 mL/acre.

Grasses controlled at 2 - 4 leaf stage

downy brome
giant foxtail
green foxtail

Persian darnel
volunteer barley
volunteer wheat

wild oats

Broadleaf weeds controlled at 2 - 4 leaf stage

annual sow-thistle*
Canada fleabane**
cleavers
common chickweed
common ragweed**
dandelion: seedlings will be
controlled; rosettes greater than 6"
(15 cm) will be suppressed
flixweed

hemp nettle
kochia*
lady's-thumb
lamb's-quarters
narrow-leaved hawk's beard**
perennial sow-thistle*
redroot pigweed
Russian thistle
shepherd's purse

smartweed
stinkweed
volunteer canola, including Roundup Ready
and CLEARFIELD
volunteer flax
wild buckwheat (1-5 leaf)
wild mustard

* Suppression

** Up to 8 cm in height

Application Information:

With: Apply with ground equipment only. Do not apply by air.

Water volume: 20 - 40 L/ac.

Application Tips

Pre-seed weed burndown/summerfallow: PrePass must be applied to emerged, actively growing weeds. Warm, moist growing conditions promote active weed growth and enhance the activity of PrePass by allowing maximum foliar uptake and contact activity. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur. For best results, ensure thorough spray coverage of target weeds. Reduced control may also occur when applied to weeds heavily covered in dust.

Fall stubble: Prepass can be applied until late October, but active weed growth must be present.

How it Works

PrePass A is taken up by leaves and stops growth of susceptible weeds rapidly via inhibition of the ALS enzyme. PrePass B is a non-selective systemic herbicide that moves through foliage into the roots, resulting in plant mortality.

Expected Results

Weeds susceptible to PrePass A will stop growing almost immediately. Newer leaves start to yellow and wilt, followed by a loss of green colour. Symptoms will spread to the rest of the plant with some weeds showing purpling or reddening. Under good growing conditions, complete control may occur within 7 - 10 days after application. Annual weeds susceptible to PrePass B will wilt and yellow within 2 - 4 days. Perennials will show similar symptoms within 5 - 10 days after application.

Restrictions

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage, reducing effectiveness. Do not apply if rainfall is imminent at time of application.

Grazing: Do not graze treated areas within 7 days of application.

Re-cropping: Pre-seed burn-down application - Fields treated with PrePass herbicide tank mix can be seeded to barley, oats or wheat in the year of application.

Summerfallow application: Fields treated with PrePass herbicide tank mix can be seeded to barley, canola, durum wheat, peas, wheat the year after treatment.

Environmental Precautions

Overspray or drift to sensitive habitats should be avoided. A buffer zone of 30 metres is required near sensitive terrestrial habitats including forested areas, shelter belts, woodlots, hedgerows, and shrublands and a 5 metre buffer zone is required near sensitive aquatic habitats. Avoid contamination of aquatic habitats.

Drift: Avoid conditions and equipment that may result in spray drift.

Toxicity

PrePass has an extremely low acute toxicity. Acute Oral LD₅₀ (rat) = >5,000 mg/kg.

Storage

Store in dry, heated storage. If products are frozen, bring to room temperature and agitate before use.



Danger Poison

Prestige XC

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container Size
Prestige XCA (PCP# 29462)	Dow	Fluroxypyr: 333 g/L	Emulsifiable concentrate	3.3 L or in bulk 4 x 9.9 L
Prestige XCB (PCP# 25464)	AgroSciences	Clopyralid: 50 g/L + MCPA: 280 g/L		2 x 8.0 L. or in bulk 4 x 96 L

120-160 acres/1 drum and 2 jugs

Crops and Timing

Crop	Timing
Barley, canarygrass, wheat, including durum	3 leaf stage until flag leaf emergence
Forage grasses (seedling or established stand) grown for seed production: Creeping red fescue, intermediate wheat grass, crested wheat grass, meadow brome grass, smooth brome grass, tall fescue, timothy	4 leaf - flag leaf stage

Caution: Do not apply to crops underseeded with legumes.

Prestige XC (cont'd)**Weeds Controlled, Rates and Staging**

Apply at 2 - 4 leaf stage, unless otherwise stated

The low rate: The 27 acre per case rate Prestige XC A at 0.13 L/acre plus Prestige XC B at 0.6 L/acre controls the following weeds

Canada thistle* (low infestation)	lamb's-quarters	volunteer flax (1-12 cm)
cleavers (1-4 whorls)	shepherd's purse	volunteer sunflower
flixweed (rosettes only)	stinkweed	wild mustard
kochia	stork's-bill ** (1-8 leaf)	

The high rate: The 20 acre per case rate Prestige XC A at .17 L/acre plus Prestige XC B at 0.8 L/acre controls the above weeds plus following weeds

annual sow thistle	perennial sow thistle*	scentless chamomile
Canada thistle (medium to high infestation)	redroot pigweed	tartary buckwheat
common chickweed**, ¹	round-leaved mallow (1 - 6 leaf)	wild buckwheat (1-4 leaf)
dandelions***	Russian pigweed	

* Season-long control of thistle with some regrowth in the fall (top growth control)

** Suppression

*** Spring rosettes only

¹ Including biotypes resistant to Group 2 herbicides

Tank Mixes

Tank mixes	Tank mixes partner rate	Additional weeds controlled
Barley, spring wheat, including durum		
Achieve Liquid + Turbocharge	200 mL per acre + Turbocharge @ 0.5 % v/v	Green foxtail, wild oats
Assert SC 300 + Acidifier	0.53 mL/acre plus acidifier	Wild oats (1 - 3 leaf stage)
	650 mL/acre plus acidifier.	Wild oats (4 leaf stage)
Puma Advance	413 mL/acre	Green foxtail, wild oats, & barnyard grass
Spring wheat, including durum		
Everest + non-ionic surfactant	17.4 g/acre+ Agral 90 or AgSurf @ 0.25 % V/V	Green foxtail, wild oats
Horizon + Score	93 mL/acre + Score @ 1.0 V/V	Green foxtail, wild oats
Bengal, Cordon, WildCat	156 mL/acre	Green foxtail
	312 mL/acre	Green foxtail, wild oats
Spring wheat and barley excluding durum		
Axial	243 mL/acre + Adigor @ 283 mL/acre	Wild oats and green foxtail

Application Information

With: Apply with ground equipment. Do not apply by air.

Water volume: 40 L/acre.

Application Tips

Prestige is a non-residual herbicide and will only control emerged weeds. Temperature range for optimum activity and control is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost before application (3 days) or shortly after (3 days) may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions. Wet foliage at time of application may result in reduced weed control. Common chickweed control: Prestige will only control chickweed that is emerged at time of application. Chickweed plants which emerge after application will not be controlled. To improve the reduction in chickweed population at the end of season, delay the timing of application as late as possible to when the majority of chickweed plants have emerged.

How it Works

The components of Prestige tank mix move within the plant to control exposed and underground plant tissue. The herbicide mimics naturally occurring plant hormones and controls weeds by disrupting normal plant growth patterns. Symptoms include twisting of stems and swollen nodes.

Expected Results

Weeds start to twist shortly after being sprayed. After twisting and bending, plants stop growing, turn brown and die. Difficult-to-control weeds such as Canada thistle and wild buckwheat stop growing, change colour to dark green and then turn yellow. Death may not occur for 14 - 21 days. Some weak Canada thistle regrowth may occur by the end of season.

Restrictions

Rainfall: Do not apply if rain is expected within 6 hours.

Grazing: Do not permit any grazing within 7 days after application. Do not harvest forage or cut hay within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Do not harvest the treated crop within 60 days after application.

Re-entry: Do not enter treated fields 12 hours after application.

Re-cropping: Fields treated with Prestige herbicide tank mix can be seeded the following year to barley, canola, flax, forage grasses, mustard, oats, peas, rye, wheat or summerfallowed. Very dry soil conditions following application can result in a risk of injury to field peas grown in the following year. If severe drought conditions are experienced during the months of June to August inclusive in the year of application (less than 140 mm rain between June 1 and August 31 or less than 175 mm rain in the whole year), delay seeding field peas an additional 12 months (22 months following application). Contact your local Dow AgroSciences representative or retailer for more information before seeding field peas following drought conditions in the previous year.

Do not seed crops other than those listed above for at least one year after treatment.

Environmental Precautions

This product is highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application or cleaning. Avoid overspray or drift to important wildlife habitats, such as ponds, wetlands, streams, woodlots and shelterbelts. Observe buffer zones specified on the label.

Runoff: Use buffers to avoid contamination of sensitive aquatic and terrestrial areas.

Leaching: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Toxicity

Prestige A: Very low mammalian toxicity. Acute oral LD_{50} (rats) = >2,000 mg/kg.

Prestige B: Clopyralid: Very low acute mammalian toxicity. Acute LD_{50} (rats) = >2,000.

MCPA: Moderate acute mammalian toxicity. Acute oral LD_{50} (rats) = technical 700 - 800 mg/kg. May cause burns upon contact with skin and eyes and can be absorbed through the skin.

Storage

Store in a dry, heated area. If product is frozen, bring to room temperature and agitate before use.



Caution Poison

Primextra II Magnum

Group 5, 15

Formulations

Product	Company	Active ingredient	Formulation	Container size
Primextra II Magnum (PCP # 25730)	Syngenta Crop Protection	Metolachlor: 400 g/L + Atrazine: 320 g/L	Flowable	1 X 14 L jug

Crops and Staging

Crop	Staging
Corn, (field, silage, sweet)	Pre-plant incorporated or pre-emergence (only if irrigated within 10 days of application).

Primextra II Magnum (cont'd)**Weeds Controlled and Staging****Pre-emergence**

American nightshade	fall panicum	purslane	yellow foxtail
annual smartweed	green foxtail	ragweed	yellow nutsedge
barryard grass	lady's-thumb	redroot pigweed	wild mustard
crabgrass	lamb's-quarters	wild buckwheat	
eastern black nightshade	prostrate pigweed	witch grass	

Rate

Weed populations	Rate	Acres treated per 14 l jug
Light infestation	1.2 L/acre	11.7
Medium infestation	1.4 L/acre	10
Heavy infestation	1.6 L/acre	8.9

Caution: Do not apply to soils with less than 1% or more than 10% organic matter.

Application Information

With: Apply with ground sprayers. Do not apply by air.

Water volume: 60 - 120 L/acre.

Application Tips

For best results, apply Primextra II Magnum herbicide/fertilizer mixtures uniformly to the soil with properly calibrated equipment immediately after blending and incorporate according to label directions.

How it Works

Absorbed by roots and inhibits photosynthesis.

Expected Results

Weeds die at germination, or under dry conditions, die back soon after emergence.

Restrictions

Rainfall: Moderate rainfall after application will enhance activity. Heavy rainfall reduces weed control.

Re-cropping: Follow corn with corn only.

Environmental Precautions

This product is toxic to non-target terrestrial plants and aquatic organisms. Use buffer zones to reduce the possibility of drift or damage to sensitive aquatic and terrestrial habitats.

Runoff: Do not spray if surface runoff likely to occur.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g., sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = atrazine 3,080 mg/kg, metolachlor = 2,780 mg/kg, Primextra = 4,680 mg/kg. May cause severe skin irritation and perhaps eye injury. Low toxicity to fish and birds. Intake may cause convulsions and coma.

Storage

Dry, heated storage preferred.

Princep Nine-T/Simazine 480



Caution Poison

Group 5

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Princep Nine T (PCP# 16370)	Syngenta Crop Protection	Simazine: 90%	Water dispersible granules	5 x 5 kg bags
Simazine (PCP# 23181)	United Agri-Products	Simazine: 480 g/L	Flowable	2 x 10 L

Crops, Rates and Timing

Crop	Rate per acre		Timing
	Princep Nine T	Simazine 480	
Alfalfa (1 year or older)	0.45 kg	Not registered	Apply in the fall after last cutting but prior to permanently frozen ground conditions. One application per season.
Bird's-foot trefoil	0.45 kg	Not registered	For stands at least one year old, apply from September to November before permanently frozen ground conditions. Apply in year of seeding if population is at least 5 plants per 10 cm ² and if plants are at least 15 cm high.
Corn	0.6 - 1.0 kg	1.4 - 3.4 L	Apply one week prior to seeding; incorporate to a depth of 2.5 cm. Use low rate on sandy soils, and the high rate on loams and clays.
Raspberries	0.8 - 1.0 kg		Apply in early spring but not on young shoots.
Shelterbelts consisting of caragana, green ash, Siberian elm, American elm, and boxelder maple	2.0 - 2.8 kg	3.8 - 5.7 L	Apply in the fall or early spring, pre-emergent to weeds. Injury may occur to trees grown in saline soils.

Weeds Controlled and Staging

Apply prior to emergence of weeds in spring.

barnyard grass
crabgrass
lamb's-quarters*
lady's-thumb

perennial species starting
from seed
purslane
ragweed*

smartweed
volunteer clovers
wild buckwheat
wild oats

yellow foxtail

*Some biotypes of these weeds may not be controlled by these products

Application Information

With: Apply with ground equipment only.

Water volume: 120 L/ac. Shelterbelts: 200 L/ac.

Application Tips

Gentle agitation required during mixing and spraying. After any break in the spray application, agitate thoroughly. Do not overlap application. Alfalfa, bird's-foot trefoil: Do not apply to same field for more than 3 consecutive years. Do not apply Gramoxone within 1 year after the Princep application.

How it Works

Acts through the roots of germinating weeds and inhibits photosynthesis, preventing emergence.

Expected Results

Weed-free ground.

Princep Nine-T/Simazine 480 (cont'd)**Restrictions**

Rainfall: Princep Nine-T requires rainfall to be activated, negligible effect on Simazine.

Grazing: Allow 30 days between application and grazing to dairy and beef cattle and sheep, and 60 days between application and cutting for hay.

Re-cropping: Re-cropping: Only corn may be planted during the season of application. If rates greater than 0.8 kg/ac are used, only corn may be planted the following year. Injury may occur to succeeding crops of white beans, onions, peas, tomatoes and turnips if dry weather occurs during the year of application. Sugar beets should not be planted the year following Princep Nine-T application.

Environmental Precautions

The active ingredient, simazine, is non-toxic to birds, insects (bees), and aquatic invertebrates and slightly toxic to fish. Avoid the potential of well or surface water contamination. Do not use this product within 10 metres of the water sources.

Leaching: Simazine is a chemical that can travel (seep or leach) through soil. Use appropriate buffer zones near water bodies or when there is a shallow water table.

Toxicity

Acute oral toxicity: Practically non-toxic. Oral LD₅₀ (rat) = > 5,000 mg/kg. May be irritating to eyes and cause dermatitis.

Storage

Store in dry area; heating not required.

Prism

Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Prism ((PCP# 23983))	E.I. duPont Canada	Rimsulfuron: 25%	Dry flowable	480 g

One 480 gram package treats 20 acres.

Crops and Timing

Crop	Timing	Remarks
Potatoes (irrigated)	Apply prior to initiation of flowering	Delay cultivation for 7 - 10 days after application.

Note: Because potato varieties differ in their tolerance to herbicides, limit first use of Prism herbicide to a small area of each variety prior to adoption as a field practice.

Weeds Controlled and Staging

Apply to young, actively growing broadleaf weeds before the canopy closes.

Annual grasses		Perennial grasses		Broadleaf	
Barnyard grass	1 - 6 leaf stage, maximum 2 tillers	Quackgrass	3 - 6 leaf stage (< 25 cm tall, leaf extended)	Lamb's-quarters (suppression)	4 - 6 leaf stage (< 10 cm tall or across)
Fall panicum				Redroot pigweed	
Green foxtail					
Witchgrass					
Yellow foxtail					

Prism (cont'd)**Rate**

Prism: 24 grams/acre plus non-ionic surfactant (Citowett Plus, Ag Surf or Agral 90): 0.25% v/v or 0.2 L/100 L of spray solution

Application Information

With: Apply with ground equipment. Do not apply by air.

Water volume: 40 L/acre.

Application Tips

A rapid fluctuation in temperature (greater than 20 °C difference within 24-36 hours) will stress the crop. For maximum crop safety, allow 48-72 hours for the crop to acclimatize before spraying Prism. For maximum crop safety, apply only when the temperature in the 24 hours before and after the application ranges between 5 °C and 28 °C. Crop injury may result if application is made to potatoes that have been stressed. If potatoes have been injured by frost, wait 48-72 hours before applying Prism herbicide.

How it Works

Prism is absorbed through the foliage and inhibits cell elongation.

Expected Result

Prism herbicide rapidly stops growth of susceptible species; typical symptoms usually appear within 5-7 days, but may not be noticeable for 2-3 weeks after application, depending on growing conditions and weed susceptibility. Warm, moist conditions following application promote the activity of Prism, while cool and/or dry conditions may reduce or delay activity. Poor results may be expected if improper mixing, timing, coverage or when weeds are under stress.

Restrictions

Rainfall: Rainfall within 2 - 4 hours of application may lessen degree of weed control.

Grazing Restrictions: Do not graze the treated crops or cut for hay; sufficient data is not available to support such use.

Pre-harvest Interval: 30 days. Make only one application per year.

Re-cropping: Barley, soybeans, white beans, red clover, sorghum, field corn, and potatoes may be planted 10 months after application. Winter wheat may be planted 4 months after application. For all other crops, a field bioassay is recommended before planting.

Environmental Precautions

Prism herbicide is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified on the label.

Runoff: Avoid contamination of aquatic and sensitive terrestrial areas by using buffer zones.

Leaching: This product may leach in coarse textured soils or where the water table is shallow.

Toxicity

Ingestion: Practically non-toxic. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. Dermal toxicity. Slightly toxic.

Storage

Store in a cool, dry, well ventilated room.

Pulsar

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Syngenta	Syngenta Crop Protection Canada Inc.	Fluroxypyr: 113.3 g/L	Emulsifiable concentrate	2 x 9.8 L and 78.6 L
		Dicamba: 86.9 g/L		

The case will cover 80 acres and the bulk container will treat 320 acres.

Crops and Staging

Crop	Staging (zadoks growth stage)
Spring and durum wheat, barley	2 - 5 leaf crop stage

Weeds Controlled, Rates and Staging

Weed stage: leaf stage, unless otherwise noted in the weed table.

Rates

Weeds controlled

Pulsar applied at 246 mL/ac
cleavers

kochia

wild buckwheat (1-4 l)

Pulsar applied at 371 mL/ac
All of the above plus
lamb's quarters (suppression)
redroot pigweed (suppression)

Russian thistle
stork's bill (suppression)

volunteer flax
wild buckwheat (up to 9 l)

MCPA Ester 500 Tank-mix @ 283 mL/acre

all of the above PLUS

burdock

cow cockle

flixweed
mustards (except dog and
green tansy)

prickly lettuce
ragweeds
Russian pigweed

shepherd's purse
stinkweed
volunteer canola

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate of herbicide tank mix partner	Remarks, additional weeds
MCPA Ester 500	Barley, spring and durum wheat	283 mL/acre	Burdock, cow cockle, flixweed* mustard, (except dog and green tansy), prickly lettuce, ragweeds, Russian pigweed, shepherd's-purse, stinkweed.
Horizon NG	Spring and durum wheat	376 mL/acre	Barnyard grass, gree foxtail, Persian darnel, wild oats, vol. oats, yellow foxtail, volunteer canaryseed.

* Flixweed susceptible at seedling stage only, top growth control only

Application Information

With: Apply with ground equipment. Do not apply by air.

Water volume: Ground (45 L/acre). Do not apply by air.

Application Tips

Do not tank mix with any other adjuvant, chemical additives, pesticides or fertilizers unless recommended on the label. For optimum results, apply Pulsar to actively growing weeds.

Weed control after application of Pulsar may be less than ideal under conditions where plants are stressed.

How it Works

Pulsar is a systemic, post-emergence herbicide for the selective control of the above mentioned weeds. Pulsar moves within the plant to control both exposed and underground plant tissues. The product controls weeds by disrupting normal plant growth patterns. Symptoms include epinasty (twisting of the stems) and swollen nodes.

Expected Results

Weeds: Can take up to 7 - 10 days depending on weather and growing conditions. Leaves curl, leaf edges turn brown, petioles twist, plant ceases growth and turns brown and dies.

Crop: Improper or untimely application can result in abnormal bending at the nodes of grain stalks, difficulty in head emergence from sheath, curled awns, malformed kernels and sterile florets. Under certain conditions, straw shortening may occur but yield will not be affected.

Rainfall: Pulsar alone can be used one hour before rainfall.

Restrictions

One application per year is permitted.

Re-cropping: Fields previously treated with Pulsar can be seeded the following year to barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye or wheat or fields can be summerfallowed.

Grazing: Do not graze cattle on treated crop, or harvest for silage until 7 days following the application of Pulsar. With tank mixes, graze or silage crop at least 12 weeks following treatment.

Pre-harvest Intervals: 60 days after application.

Drift: Reduce drift and buffer zones by using either individual nozzle shields or a boom shield.

Buffer zone guideline: Terrestrial habitats: 15 metres; aquatic habitats: 15 metres.

Toxicity

Dicamba: Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 2,629 mg/kg. Fluroxypyr has very low mammalian toxicity. Acute oral LD₅₀ is >2,000 mg/kg.

Puma¹²⁰ Super/Puma Advance/ WildCat/Bengal/Cordon/Vigil



Warning Poison

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Puma ¹²⁰ Super (PCP# 25864)	Bayer CropScience	120 g/L fenoxaprop-p-ethyl	EC	4 L, 6.2 L, 99.3 L, 800 L & Bulk
Bengal* (PCP# 29268)	MANA	120 g/L fenoxaprop-p-ethyl	EC	2 x 6.2L, 99.3 L pod
WildCat (PCP# 29151)	Viterra	120 g/L fenoxaprop-p-ethyl	EC	12.4L, 312 L
Cordon (PCP# 29494)	Nufarm Agriculture Inc	120 g/L fenoxaprop-p-ethyl	EC	18.6 L jug
Puma Advance (PCP# 29488)	Bayer CropScience	90 g/L fenoxaprop-p-ethyl	EC	8.25 L jug, 1000 L shuttle
IPCO Vigil (PCP# 29273)*	Interprovincial Cooperative Ltd.	120 g/L fenoxaprop-p-ethyl	EC	2 x 6.2 L,

*Bengal/IPCO Vigil are registered only for use on wheat. Do not use on barley

Puma¹²⁰ Super/Puma Advance/WildCat/Bengal/Cordon/Vigil (cont'd)**Crops and Staging**

Crops	Recommended stage
Spring and durum wheat	1 - 6 leaves on main stem plus 3 tillers. (Zadoks 11-16,23)
Barley ^{1,2}	1 - 5 leaves on main stem plus 2 tillers. (Zadoks 11-15,22) (1 - 6 leaf plus 3 tillers with Puma Advance)
Perennial rye grass (seed production only)	2 - 4 leaf stage

¹ Do not apply Puma¹²⁰ Super/WildCat/Cordon alone in barley. Always tank mix with a registered broadleaf partner. **Note:** Initial crop injury may be observed after application, but this is temporary and should not affect yield. This injury is most likely to occur when applications are made under stress conditions or when applications are made past the recommended leaf stage. Severe crop injury will occur as a result of spray overlap.

² Puma¹²⁰ Super, Cordon and WildCat are registered for use in barley. Do not use Bengal or Vigil in barley.

Weeds and Staging

Grassy weeds	Stage	Rate
wild oat (low infestation)	1 - 6 leaf (up to emergence of 3rd tiller)	268 - 271 mL/acre, 412 mL/acre Puma Advance ³
wild oat (moderate to heavy infestation)	1 - 6 leaf (up to emergence of 3rd tiller)	312 mL/acre, 412 mL/acre Puma Advance ³
green foxtail (wild millet)	1 - 6 leaf (up to emergence of 3rd tiller)	156 mL/acre, 412 mL/acre Puma Advance ³
yellow foxtail		
barnyard grass		

³ NOTE: No reduced rate registered for Puma Advance. Puma Advance rate is 412 mL/acre for all susceptible grassy weeds.

Tank Mixes: Check individual labels for exact tank mix partners. Some products are registered for individual mixes not listed below.

Tank mix partner	Tank mix partner rate	Puma ¹²⁰ Super/WildCat/Cordon/Bengal*, IPCO Vigil* rate (Puma Advance rate in brackets)	
		Wild oat, green foxtail, yellow foxtail, barnyard grass	Green foxtail alone (only with Puma Super/WildCat/Cordon/Bengal/Vigil). No reduced rate using Puma Advance
Spring wheat, durum wheat and barley			
2,4-D 600 ester	283 mL/acre	312 mL/acre (412 mL/acre) ³	156 mL/acre
2,4-D 700 LV ester	243 mL/acre		
Ally	2.0 - 3.0 g/acre		
Buctril M	405 mL/acre		
Curtail M	606 - 808 mL/acre		
Dichlorprop D	708 mL/acre		
DyVel	500 mL/acre	No	156 mL/acre
Estoprop	710 mL/acre	312 mL/acre (412 mL/acre) ³	156 mL/acre
Express Pack: Express + 2,4-D 700 LV	4.0 g/acre + 243 mL/acre	No	156 mL/acre
Frontline: Frontline A + Frontline B	40 mL/acre + 335 mL/acre	No	156 mL/acre

Puma¹²⁰ Super/Puma Advance/WildCat/Bengal/Cordon/Vigil (cont'd)

Tank mix partner	Tank mix partner rate	Puma ¹²⁰ Super/WildCat/Cordon/Bengal*, IPCO Vigil* rate (Puma Advance rate in brackets)	Wild oat, green foxtail, yellow foxtail, barnyard grass	Green foxtail alone (only with Puma Super/WildCat/Cordon/Bengal/Vigil) No reduced rate using Puma Advance
Spring wheat, durum wheat and barley				
Infinity	335 mL/acre	312 mL/acre (412 mL/acre) ³		156 mL/acre
MCPA 500 amine	340 mL/acre			
MCPA 500 ester	340 mL/acre			
Mecoprop	2.2 - 2.8 L/acre			
Prestige: Prestige A + Prestige B	324 mL/acre + 810 mL/acre			
Refine SG	8 g/acre	312 mL/acre (412 mL/acre) ³		156 mL/acre
Refine SG + Buctril M	2.7 g/acre + 400 mL/acre			
Refine SG + MCPA 500 ester	8 g/acre + 340 mL/acre			
Spectrum: Frontline A + Spectrum B	40 mL/acre + 600 mL/acre	No		156 mL/acre
Thumper	405 mL/acre	312 mL/acre (412 mL/acre) ³		156 mL/acre
Triton: Refine SG + Accord	8 g/acre + 27 g/acre	312 mL/acre (412 mL/acre) ³		No
Trophy: Trophy A + Trophy B	243 mL/acre + 453 mL/acre	312 mL/acre (412 mL/acre) ³		No
Turboprop 600	710 mL/acre			
Spring and durum wheat only		Puma¹²⁰ Super/WildCat/Cordon/Bengal rate		
Attain: Attain A + Attain B	243 mL/acre + 404 mL/acre	312 mL/acre (412 mL/acre) ³		156 mL/acre
DyVel DSp	440 mL/acre	Not registered at wild oat rate		
Leader	500 mL/acre	312 mL/acre (412 mL/acre) ³		
Logic M	500 mL/acre			
Lontrel 360	170 mL/acre			
Lontrel 360 + MCPA 500 ester	170 mL/acre + 340 mL/acre			No
Mecoprop-p	2.2 - 2.8 L/acre			No

³ NOTE: No reduced rate registered for Puma Advance. Puma Advance rate is 412 mL/acre for all susceptible grassy weeds.

*Bengal/PCO Vigil not to be used with barley.

Application Information

How to Apply: Apply with ground sprayers or by air.

Water Volume: Ground: 23 - 45 L/acre. Use higher water volume for dense canopies. Air: 13.5 L/acre.

Application Tips

Application beyond the 6 leaf stage in spring wheat, durum wheat or barley may result in injury. Early application is important to maintain crop safety. Initial crop injury may occur in the form of crop shortening or discolouration and is more likely when fenoxaprop is applied alone and not tank mixed or is applied past the recommended leaf stage or under stressful growing conditions. Barley tends to be more susceptible to this injury than wheat. This condition is temporary and should not affect yield.

Under stressed conditions and/or heavy crop canopy, early application will result in improved grassy weed control. If another pesticide has already been applied, wait 7 days before applying Puma¹²⁰ Super/Puma Advance /WildCat/

Puma¹²⁰ Super/Puma Advance/WildCat/Bengal/Cordon/Vigil (cont'd)

Bengal/Cordon, or following application of Puma¹²⁰ Super/Puma Advance/WildCat/Bengal/Cordon, a 4 day interval is required before applying another pesticide, except for those recommended on the label.

How it Works

Fenoxaprop-p-ethyl is a contact as well as systemic herbicide. It has no soil residual activity. Regions of high meristematic activity, such as root and shoot tips, are known to be affected.

Expected Results

Reduction of leaf growth and chlorosis blotching within 1 - 3 days after application. Initial development of leaf chlorosis within 5 - 8 days after application and complete death within 14 - 21 days.

Restrictions

Rainfall: Do not apply if rain is expected within 1 hour after spraying.

Grazing: Do not graze the treated crops or cut for hay within 25 days of application or harvest for grain within 65 days of application. Do not graze treated perennial ryegrass or cut for straw within 65 days of application.

Re-cropping: No restrictions the year after application.

Environmental Precautions

Fenoxzprop-p-ethyl is toxic to fish, daphnids, aquatic plants, terrestrial plants and some terrestrial invertebrates. Avoid contamination of aquatic systems during application and cleanup. Leave a 3- 10 metres buffer zone around sensitive aquatic or terrestrial habitats.

Toxicity

Moderate acute mammalian toxicity. May cause burns upon contact with skin and eyes, and it can be absorbed through the skin.

Storage

If stored for 1 year or longer, shake well before using.

Pursuit 240/MultiStar/Gladiator

Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Pursuit (PCP# 23844)	BASF Canada	Imazethapyr: 240 g/L	Aqueous solution	3.3 L
MultiStar (PCP # 29259)	Viterra			
Guardsman Gladiator (PCP# 28923)	Univar			

Note: Surfactant is not included in the package.

One 3.3 L container treats 39 acres.

Crops, Staging and Rates

Crop	Timing	Rate per acre
Alfalfa (newly seeded pure stand) for forage or seed production or established for seed production	Apply after the first trifoliate leaf stage. For new stands, before the alfalfa reaches 30 cm in height for established stands.	85 mL/acre plus non-ionic surfactant such as Agral 90 or AgSurf @ 0.25% v/v.
Chickling vetch/grass pea (seed production only)	Apply at the 5 - 7 leaf stage.	
Dry beans (pinto, pink, red)	Up to and including the second trifoliate leaf stage.	
Field peas	May be applied up to the sixth above-ground node stage (6 true leaves).	

Caution: Pursuit/MultiStar is only registered in the Black and Gray Wooded soil zones of the Prairie Provinces. Pursuit/MultiStar/Gladiator are NOT registered for use in the Brown and Dark Brown soil zones with the exception of dry beans and alfalfa (newly seeded pure stand for forage or seed production) under irrigation.

Weeds Controlled and Staging

Apply early post-emergence (up to and including the 4 leaf stage), unless otherwise indicated.

Field peas/chickling vetch, grass pea	Newly seeded pure stand alfalfa for forage or seed production	Dry beans (pinto, pink, red)
chickweed* cleavers* green foxtail hemp-nettle redroot pigweed shepherd's purse* smartweed stinkweed* volunteer canola wild buckwheat (suppression) wild mustard* wild oats (suppression)	common groundsel (suppression) green foxtail (suppression) green smartweed redroot pigweed (suppression) stinkweed* volunteer canola wild mustard*	hairy nightshade

* Excluding Group 2 resistant biotypes.

Tank Mixes

No tank mixes registered.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 40 - 160 L/ac.

Application Tips

Do not spray Pursuit/MultiStar/Gladiator if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing.

How it Works

Absorbed by foliage and roots. Disrupts plant metabolism causing growth to stop. Works best under good growing conditions.

Expected Results

Susceptible weeds stop growing within 24 - 48 hours. Yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks.

Restrictions

Rainfall: Rainfall within 6 hours of application may reduce activity.

Pursuit 240/MultiStar/Gladiator (cont'd)

Grazing: Alfalfa - may be grazed or harvested for forage 14 days after application. Field peas - may be fed to livestock 30 days after application. Other crops - do not graze treated crops or cut for feed prior to crop maturity.

Pre-harvest Interval: Field peas and chickling vetch - do not apply within 60 days of harvesting. Alfalfa - do not harvest within 14 days after application. Beans - do not harvest within 75 days after application.

Re-cropping: Black, Gray Wooded and Irrigated Brown soil zones: Spring wheat, CLEARFIELD canola, field peas, lentils and alfalfa may be planted the season following a Pursuit/MultiStar/Gladiator application. Barley may be planted in the Black and Gray Wooded soil zones the season following application. For other crops, call BASF at 1-877-371-2273. Perform a field bioassay on other crops prior to planting them on a field-scale. In case of crop failure, replant only to CLEARFIELD canola or field peas the year of application.

Environmental Precautions

Pursuit/MultiStar/Gladiator are toxic to aquatic and non-target terrestrial plants. Do not apply within 15 metres of shelterbelts, water bodies, wetlands and woodland lots.

Toxicity

Oral - practically non-toxic. Acute Oral LD₅₀ (rats) = > 5,000 mg/kg.

Storage

Store at temperatures above 0°C. If product is exposed to temperatures below 0°C during shipment or storage, make sure the product has thawed completely and shake container vigorously.

Pyramin

Caution Poison

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Pyramin (PCP # 15857)	BASF Canada	Pyrazon: 430 g/L	Flowable	3 L jug

Crop, Staging and Rate

Crop	Staging	Rate per acre
Sugar beet	Fall pre-plant incorporated: Apply in the fall before the ground freezes and incorporate to a depth of not more than 5 cm. Spring pre-plant incorporated: Apply on the soil and incorporate to a depth of not more than 5 cm immediately before seeding.	Heavy and medium soils: 4.14 L. Light soils*: 3.3 L. Apply in 81 - 202 L of spray solution/acre.
	Pre-emergence: Apply after seeding and before beets and weeds germinate.	Heavy and medium soils: 4.14 L. Light soils*: 3.3 L. Apply in 81 - 202 L of spray solution/acre.
	Post-emergence Apply after the first true leaf of the beet is 2.5 cm long. Do not apply when beets are in the cotyledon stage.	All soils: 3.33 L plus Citowett Plus @ 250 mL/100 L of water and apply in 120 - 160 L of water per acre. Caution: Do not use Assist Oil Concentrate.

* On soils classified as sands and loamy sands, crop injury can occur if the organic matter is less than 3%.

Weeds Controlled and Staging

For post-emergent applications, weeds should not be larger than 3-true-leaf stage.

black nightshade
chickweed
knotweed
lady's-thumb

lamb's-quarters
oak leaf goosefoot
prostrate pigweed
purslane

ragweed
redroot pigweed
shepherd's-purse
smartweed

stinkweed
wild buckwheat
wild carrot (seedlings)

wild mustard
wormseed mustard
yellow rocket
(seedlings)

Tank Mixes

Tank mix partner	Pyramin + tank mix partner rate	Remarks
Nortron	Pyramin @ 2.12 L/acre + Nortron @ 1.48 L/acre	Apply one application per year, prior to weed emergence.

Application Information

With: Ground equipment. Do not apply by air.

Water volume: See above. Rates for row spacing and band width are variable.

Incorporation: Pre-plant - incorporate shallow. Fall ridging - apply Pyramin in a 17.5 cm band and cover with a 15 - 20 cm high ridge of soil. In the spring, level the ridges and leave guide marks to enable planting the bands. Avoid levelling deeper than the chemical placement.

Application Tips

Pyramin must not be mixed into soil deeper than seed is planted to reduce beet injury.

How it Works

The active ingredient in Pyramin is absorbed by the roots and is translocated to the leaves.

Expected Results

If adequate moisture is present, the weeds will fail to emerge. If the soil is dry for a long time, weeds that emerge and become well established will not be fully controlled, but small emerged weeds may die back, once adequate moisture is present.

Restrictions

Rainfall: No effect.

Grazing: The tops of beets grown in Pyramin-treated soil may be used for human consumption or fed to livestock.

Re-cropping: None.

Environmental Precautions

Do not apply Pyramin to aquatic organisms and terrestrial plants. Do not apply within 5 metres of sensitive terrestrial habitats and 1 metre of sensitive aquatic habits.

Runoff: Avoid contamination of aquatic areas and sensitive terrestrial habitats as a result of runoff by including a buffer strip between the treated area and the sensitive areas.

Leaching: Avoid application where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Drift: Care should be taken to avoid drift onto sensitive plants such as rapeseed and mustard.

Toxicity

Oral - Low toxicity. Acute oral LD₅₀ (rats) = > 2,369 mg/kg.

Storage

Store in a cool, dry place. Do not store below 0°C.

Refine M/Broadside



Warning Poison

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size*
Refine M: Refine SG (PCP# 28285)	E.I. duPont Canada	Thifensulfuron methyl: 33.35% + Tribenuron methyl: 16.65%	Soluble granules	486 g
MCPA ester LV 600 (PCP# 29002)		MCPA ester: 600 g/L	Concentrate	9.1 L jugs
Broadside: Refine SG (PCP # 28286)	Viterra	Thifensulfuron methyl: 33.35% + Tribenuron methyl: 16.65%	Soluble granules	486 g
Broadside: MCPA (PCP # 29002)		MCPA ester: 600 g/L	Concentrate	9.1 L jugs

* Each case contains 2 split jugs that hold 486 g of Refine SG and 9.1 L of MCPA ester

Crops and Staging

Crop	Staging
Barley, oats, spring wheat, including durum	full 3 leaf to flag leaf stage

Weeds Controlled and Staging

Apply to apply to young, actively growing weeds that are less than 10 cm in height or diameter, unless otherwise indicated.

annual smartweed (green smartweed, lady's-thumb)	cow cockle	lamb's quarters	tartary buckwheat
ball mustard	dandelion	narrow-leaved hawk's beard	volunteer canola*
chickweed (1 - 6 leaf)	flixweed	redroot pigweed	volunteer sunflower
common groundsel	hemp-nettle,	Russian thistle	wild buckwheat (up to 5 leaf)
corn spurry	kochia (excluding Group 2 resistant biotypes)***	shepherd's-purse	wild mustard
Weeds suppressed		stinkweed	
Canada thistle**	round leaved mallow (1 - 6 leaf)	sow thistle**	toadflax (< 15 cm tall)
cleavers (1 - 3 whorls)	scentless chamomile	stork's bill (2 - 6 leaf)	

* Including CLEARFIELD canola

** Apply when the majority of thistles have emerged and are actively growing. For best top growth control, apply before bud stage when thistles are no larger than 15 cm in height and before crop canopy prevents thorough coverage of weeds.

***Note. A recent weed survey in Alberta shows 90% of fields have kochia resistant to Group 2 herbicides. Without testing, assume kochia in your fields are resistant and another broadleaf herbicide from another herbicide group will be needed to control kochia.

Rate

Refine SG: 12 g/acre + non-ionic surfactant (Agral 90, Ag Surf or Citowett Plus at 0.2L/100L of spray solution + 228 mL/ac of MCPA ester.

Tank Mixes

Tank mix partner	Tank mix partner rate per acre	Weeds controlled
Wheat (including durum) and barley		
Axial + Adjuvant	Axial @ 162 - 243 mL/acre + Adgior @ 0.8 %v/v	Broadleaf weeds controlled or suppressed by Refine M alone, plus wild oats, volunteer oats, green foxtail, yellow foxtail, Persian damel, volunteer canary seed, and proso millet.
Fenoxaprop-p-ethyl (Puma ¹²⁸ Super, WildCat, Cordon)	Fenoxaprop-p-ethyl r @ 0.16 - 0.31 L (Puma Advance @ .mL/acre)	Refine M susceptible weeds plus wild oats, green foxtail, barnyard grass and yellow foxtail.

Tank mix partner	Tank mix partner rate per acre	Weeds controlled
Spring wheat (including durum)		
Clodinafop propargyl (Horizon, Foothills, Signal, Ladder, NextStep, Legend) + adjuvant	Refine SG @ 12 g/acre + clodinafop propargyl @ 93 - 115 mL/acre + adjuvant @ 0.8 % v/v. (Use 1.0% v/v at high rates)	Refine M susceptible weeds plus wild oats, green foxtail.
Fenoxaprop-p-ethyl (Bengal, Vigil)	Fenoxaprop-p-ethyl @ 93 - 115 mL/acre	Refine M susceptible weeds plus wild oats, green foxtail, barnyard grass and yellow foxtail.
Everest + surfactant	Refine @ 12.0 g/acre + Everest @ 17.3 g/acre + MCPA 600 @ 283 mL/acre + non ionic surfactant @ 0.25% v/v	All weeds controlled by Refine M plus wild oats, green foxtail, volunteer tame oats.

Application Information

With: Ground and aerial equipment.

Water volume: Ground: 22 L/ac (minimum).

Application Tips

Higher spray volumes are required for dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Effectiveness of Refine SG may be reduced if it remains in the tank for more than 24 hours.

How it Works

Absorbed through foliage. Refine SG inhibits cell elongation. MCPA ester is a systemic herbicide absorbed by leaf and stem and translocated to actively growing regions. It disrupts cell division causing abnormal growth.

Expected Results

Weeds: Growth stops immediately. Discolouration of dying weeds may not be noticeable for 1 - 3 weeks after application depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 2 hours of application may lessen degree of weed control with Refine M.

Grazing: Barley, wheat and oats may be grazed or fed to livestock 7 days after application of Refine M. Do not graze the treated crop or cut for hay within 7 days of application of Refine SG.

Re-cropping: Canola, flax, lentils and alfalfa may be planted 2 months after application of Refine M. There are no restrictions on next crop year. Note: Do not exceed a total of 12 g/ac per crop year for the Refine SG part of Refine M.

Environmental Precautions

Refine SG is toxic to aquatic organisms and non-target terrestrial plants. For ground applications, maintain a 15 metre buffer zone between last spray swath and sensitive terrestrial habitats. For aerial applications, leave 1 metre from the downward edge of the boom and shallow aquatic habitats.

Runoff: Avoid contamination of aquatic and sensitive terrestrial areas as a result of runoff.

Observe buffer zones specified under Directions for Use on the label.

Toxicity

Low acute toxicity. Thifensulfuron methyl: Low oral toxicity. Oral LD₅₀ (rat) = > 5,000 mg/kg Neither thifensulfuron methyl nor tribenuron methyl are skin or eye irritants. Tribenuron methyl: Low oral toxicity. Oral LD₅₀ (rat) = > 5,000 mg/kg

MCPA: Moderate acute toxicity. Acute oral LD₅₀(rat) = 900 - 1,400 mg/kg. Slightly irritating to the skin and severely irritating/corrosive to the eye.

Storage

Store in a cool, dry place.

Refine SG



Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Refine SG ((PCP# 28285)	E.I. duPont Canada	Thifensulfuron methyl: 33.35% + tribenuron methyl: 16.65%	Soluble granules	480 grams

One 480 gram package treated 40 acres

Crops and Staging

Crop	Timing
Cereals: Barley, oats, spring wheat, including durum, winter wheat	2 leaf to flag leaf stage
Seedling or established grasses for forages or seed production: meadow bromegrass, smooth bromegrass, creeping red fescue, tall fescue (seedling only), Kentucky bluegrass (established stand only), orchard grass, crested wheatgrass, intermediate wheatgrass, northern wheatgrass, pubescent wheatgrass, slender wheatgrass, streambank wheatgrass, tall wheatgrass, western wheatgrass	Apply post-emergence

Weeds Controlled and Staging

Apply to young, actively growing weeds that are less than 10 cm in height or diameter, unless otherwise indicated.

annual smartweed (green
smartweed, lady's-thumb)
ball mustard
chickweed (1 - 6 leaf)
common groundsel
corn spurry

cow cockle
flixweed
hemp-nettle,
kochia**
lamb's-quarters
narrow-leaved hawk's beard

redroot pigweed
Russian thistle
shepherd's-purse
stinkweed
tartary buckwheat

volunteer canola (excluding
clearfield varieties).
volunteer sunflower
wild buckwheat (up to 5 leaf)
wild mustard

Weeds suppressed

Canada thistle*
cleavers (1 - 3 whorls)

round leaved mallow (1 - 6
leaf)

scentless chamomile
sow thistle*

stork's bill (2 - 6 leaf)
toadflax (< 15 cm tall)

* Apply when the majority of thistles have emerged and are actively growing. For best top growth control, apply before bud stage when thistles are no larger than 15 cm in height and before crop canopy prevents thorough coverage of weeds.

**Prairie-wide surveys of kochia fields have found approximately 90% of kochia populations are resistant to Group 2 herbicides. Without testing, assume kochia in your field is resistant and will not be controlled by this product alone.

Rate

Refine SG 2 12 g/acre + non-ionic surfactant (Agral 90, Ag-Surf or Citowett Plus) at 0.2 L/100 L of spray solution.
40 acres treated per case.

Tank Mixes

Tank mix partner	Tank mix partner rate per acre	Weeds controlled in addition to those controlled by Refine SG
Wheat (spring, durum, winter) and barley		
2,4-D amine or ester + surfactant	Refine @ 12 g/acre + 2,4-D 500 @ 0.34 - 0.45 L + surfactant @ 0.2% of spray solution	Apply when crop stage is at full 3 leaf to expanded shot blade. Burdock (seedling), cocklebur, common plantain, dandelions, ragweed, hare's-ear mustard, Indian mustard, prickly lettuce, tumble mustard, wild radish, wormseed mustard.

Refine SG (cont'd)

Tank mix partner	Tank mix partner rate per acre	Weeds controlled in addition to those controlled by Refine SG
Spring wheat (including durum) and barley		
Assert	0.53 - 0.65 L	Wild oats.
Assert + MCPA	Assert @ 0.53 - 0.65 L + MCPA @ 0.28 - 0.45 L	Wild oats.
Axial + Adgior or Merge	Refine @ 12.0 g/acre + Axial @ 161 - 242 mL/acre + Adgior or Merge @ 283 mL/acre.	Wild oats, volunteer oats, green foxtail, yellow foxtail, Persian darnel, volunteer canary seed, and proso millet.
Axial + MCPA ester 500 + Adgior or Merge	Refine @ 12.0 g/acre + Axial @ 161 - 242 mL/acre + MCPA ester 500 @ 0.28 - 0.45 L/acre + Adgior or Merge @ 283 mL/acre.	Broadleaf weeds controlled MCPA, plus wild oats, volunteer oats, green foxtail, yellow foxtail, Persian darnel, volunteer canary seed, and proso millet.
Banvel II + Adjuvant	Refine @ 12.0 g/acre + Banvel II @ 44.5 - 58.7 mL + surfactant @ 2 L/1000 L of spray solution	Apply when crop at 2 - 5 leaf stage. kochia (including Group 2 resistant kochia) and dandelion (spring or fall rosettes, less than 15 cm in diameter).
MCPA 500 amine or ester + surfactant	Refine @ 12.0 g/acre + MCPA @ 0.28 - 0.45 L + surfactant @ 0.2% of spray solution	Apply when crop stage is full 3 leaf to expanded shot blade. Burdock (seedling), cocklebur, common plantain, dandelions, ragweed, hare's-ear mustard, Indian mustard, prickly lettuce, tumble mustard, wild radish, wormseed mustard.
Fenoxaprop-p-ethyl(Puma ¹²⁰ Super, Cordon, WildCat)	Fenoxaprop-p-ethyl @ 0.16 - 0.31 L/acre	Wild oats, green foxtail, barnyard grass and yellow foxtail.
Puma ¹²⁰ Super + MCPA ester	Puma ¹²⁰ Super @ 0.16 - 0.31 L + MCPA ester @ 0.23 - 0.34 L/acre	MCPA susceptible weeds plus volunteer CLEARFIELD canola (MCPA applied at 0.34 L/acre) plus wild oats, green foxtail, barnyard grass and yellow foxtail.
Spring wheat (excluding durum) and barley		
Attain + surfactant	Refine @ 12.0 g/acre + Attain A @ 120 mL/acre + Attain B @ 202 mL/acre + surfactant @ 0.2% of spray solution.	Cleavers (excluding Group 2 resistant cleavers).
Curtail M + surfactant	Refine @ 12.0 g/acre + Curtail M @ 600 mL/acre + surfactant @ 0.2% spray solution	Canada thistle and wild buckwheat.
Lontrel 360 + adjuvant	Refine @ 12.0 g/acre + Lontrel 360 @ 85 mL/acre + surfactant @ 0.2% spray solution	Broadleaf weeds controlled or suppressed by Refine SG alone, as well as Canada thistle (seasonal control) and wild buckwheat.
Lontrel 360 + 2,4-D ester 600 + adjuvant	Refine @ 12.0 g/acre + Lontrel 360 @ 85 mL/acre + 2,4-D ester 600 @ 283 mL/acre + surfactant @ 0.2% spray solution	All other weeds controlled by Refine SG alone, as well as Canada thistle (seasonal control), lady's thumb, perennial sow thistle, stinkweed, volunteer canola, wild buckwheat and wild mustard.
Lontrel 360 + MCPA ester 600 + adjuvant	Refine @ 12.0 g/acre + Lontrel 360 @ 85 mL/acre + MCPA ester 600 @ 283 mL/acre + surfactant @ 0.2% spray solution	All other weeds controlled by Refine SG alone, as well as Canada thistle (seasonal control), lady's thumb, perennial sow thistle, stinkweed, volunteer canola, wild buckwheat and wild mustard.
Spring wheat (excluding durum)		
Everest + 2,4-D + surfactant	Refine @ 12.0 g/acre + Everest @ 17.3 g/acre + 2,4-D ester 600 @ 283 mL/acre + surfactant @ 0.25% v/v	All weeds controlled by 2,4-D plus wild oats, green foxtail, volunteer tame oats.
Everest SG + Banvel II + surfactant	Refine @ 12.0 g/acre + Everest @ 17.3 g/acre + Banvel II @ 45 - 59 mL/acre + surfactant @ 0.25% v/v	Kochia (including Group 2 resistant kochia), green foxtail and wild oats.

Refine SG (cont'd)

Tank mix partner	Tank mix partner rate per acre	Weeds controlled in addition to those controlled by Refine SG
Spring wheat (including durum)		
Clodinafop propargyl (Horizon, NextStep, Foothills, Signal, Ladder, Vigil) + adjuvant	Refine SG @ 12 g/acre + Horizon @ 93 - 115 mL + adjuvant @ 0.8 % v/v	MCPA susceptible weeds plus wild oats, green foxtail.
Clodinafop propargyl + MCPA + adjuvant	Refine SG @ 12 g/acre + Horizon @ 93 mL + MCPA ester 600 @ 282 - 371 mL/acre + adjuvant @ 0.8 % v/v	MCPA susceptible weeds plus wild oats, green foxtail.
Clodinafop propargyl + Banvel II + adjuvant	Refine SG @ 12 g/acre + Horizon @ 93 mL + Banvel II @ 44.5 - 58.7 mL + adjuvant @ 0.8 % v/v	Banvel susceptible weeds plus kochia (including Group 2 resistant biotypes), wild oats, green foxtail.
Fenoxaprop-p-ethyl (Bengal, Vigil)	See under Puma Super above	See under Puma ¹²⁰ Super above.

Application Information

With: Ground and aerial equipment.

Water volume: Ground: 22 L/ac (minimum). Air: 11 L/ac.

Application Tips

Higher spray volumes are required for dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Effectiveness of Refine SG may be reduced if it remains in the tank for more than 24 hours. Use Assert tank mixes within 12 hours.

How it Works

Absorbed through foliage. Inhibits cell elongation.

Expected Results:

Weeds: Growth stops immediately. Discolouration of dying weeds may not be noticeable for 1 - 3 weeks after application depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 1 hour of application may lessen weed control.

Grazing: Barley, wheat and oats may be grazed or fed to livestock 7 days after application of Refine SG.

Re-cropping: Do not plant any crop until 2 months after application. There are no restrictions on next crop year.

Note: Do not exceed a total of 12 g/ac per crop year for Refine SG.

Environmental Precautions

Refine SG is toxic to aquatic organisms and non-target terrestrial plants. Follow label buffer zones between application areas and sensitive habitat. For ground applications, maintain a 15 metre buffer zone near shelterbelts, wetlands, sloughs or dry slough borders and woodlots. For aerial applications, leave a 1 metre buffer around aquatic habitats.

Runoff: Avoid contamination of aquatic and sensitive terrestrial habitats.

Drift: Observe buffer zones specified under Directions for Use on the label.

Toxicity

Low acute toxicity. Thifensulfuron methyl: Low oral toxicity. Oral LD₅₀ (rat) = > 5000 mg/kg. Tribenuron methyl: Low oral toxicity. Oral LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Store in a cool, dry place.

Reglone Desiccant



Caution Poison

Group 22

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Reglone (PCP # 26396)	Syngenta Crop Protection	Diquat:240 g/L	Liquid	10 L, 115 L

Crops and Staging

Crop	Staging
Beans (Adzuki, red and white), soybeans	Apply when 80 - 90% natural leaf defoliation and when at least 80% of the pods have turned yellow.
Canola (Argentine varieties only)	Apply when 90% seed turn brown stage. Increased level of green seed may result from earlier applications when seed is not properly advanced.
Chickpeas	Desi Type: Apply when the majority of plants are yellow and most pods are mature and seeds have turned from green to yellow or brown. Kabuli Type: Apply when the majority of plants and pods are ripe and dry with seeds turned from green to white or tan and detached from the pods.
Flax, solin	Apply when 75 percent of bolls turn brown (normal swathing time).
Fababeans	Apply when 80 - 90% natural leaf defoliation and when at least 80% of the pods have turned yellow.
Legumes: Alfalfa, bird's-foot trefoil, red and white clover (for seed production only)	Prior to seed harvest. To prevent seed pods from shattering and subsequent loss of seed, the interval between spraying and harvest should not exceed 7 days. Note: Do not use Reglone on forage legumes that have been treated with a residual herbicide in the past 12 months.
Lentils	Apply at the time swathing would normally commence. This is when the lower-most pods are yellow-brown and seeds rattle.
Mustard (condiment type)	Spray when the crop is at the 75% seed turn brown stage.
Peas (field and dry)	Apply when bottom pods of the majority of the plants are ripe & dry with the seeds detached from the pods.
Potato - vine kill	Apply at least 2 weeks before harvest. Do not apply Reglone during drought periods, especially when soil is so dry that plant leaves wilt during the day. After such conditions wait at least 3 days after soil has been moistened by rain or irrigation.
Sunflower	When the seeds reach maturity (20 - 50% moisture in the seed and hull).

Rates and Water Volume

Crop	Crop condition	Ground application		Aerial application	
		Rate per acre	Water volume per acre	Rate per acre	Water volume per acre
Beans (Adzuki, red and white), soybeans, canola, chickpeas*, flax, lentils, mustard, sunflower, field peas	Full canopy, few weeds	0.5 - 0.69 L	90 - 220 L	0.69 - 0.85 L	18 L
	Higher rate with very dense canopy, weedy crop or secondary growth	0.69L		0.85 L/acre	
Legumes: Alfalfa, bird's-foot trefoil, red and white clover	Full canopy, few weeds	0.69 L	90 - 220 L	1.1 L	
	Very dense canopy weedy crop, secondary growth	1.1 L			

Reglone Desiccant (cont'd)

Crop	Crop condition	Ground application		Aerial application	
		Rate per acre	Water volume per acre	Rate per acre	Water volume per acre
Potatoes - vine kill	Top growth heavy	1.41 L	220 - 445 L	1.41 L	18 L
	Top growth light	0.69 - 0.92 L	220 - 445 L	0.69 - 0.92 L	

* Not registered for aerial application.

Note: Add Agral 90 or Ag-Surf at the rate of 1 L/1,000 L of spray solution.

Application Information

With: Apply with ground equipment or by air.

Water volume: See above table.

Application Tips

Muddy water will reduce effectiveness. Applications made on cloudy days or just prior to or during periods of darkness will increase effectiveness. Immature weeds may require higher application rates to increase effectiveness.

How it Works

Reglone is a contact type herbicide; therefore, thorough spray coverage is essential. Absorbed by all leaf and stem surfaces, non-systemic. Interferes with photosynthesis.

Expected Results

Weeds: Fast and virtually complete top kill of annual weeds. Yellowing starts within a few hours of application. Desiccation of the plant will continue rapidly till death.

Crops: Leaf kill will occur within a few days of application. Stem dry-down will take longer depending on the crop; however, harvesting should normally commence within 7 - 14 days. Crop losses can occur due to pod drop and pod shatter from handling and if unfavourable weather conditions occur. **Warning:** During adverse weather (heavy rain, hail or strong winds), the resultant damage to crops may be enhanced.

Restrictions

Rainfall: No effect once the spray solution has dried.

Grazing: Crop waste remaining after harvest (e.g. pea and lentil vines, alfalfa stems, etc.) may be used as a feed supplement for livestock.

Pre-harvest Interval: For most crops, harvest can normally commence within 4-10 days after desiccation. Alfalfa, bird's-foot trefoil, red clover, white clover - to prevent pod shattering and loss of seed, the interval between spraying and harvest should not exceed 7 days. Canola/mustard - Combine no later than 14 days after application. Reglone desiccant should only be used on argentine varieties to facilitate a harvest of lodged crops. Losses can occur due to pod drop and pod shatter from handling or if unfavourable weather conditions occur as described under product information.

Flax and peas - harvest when seed tests "dry".

Environmental Precautions

Reduce chance of drift and contamination of any aquatic or sensitive terrestrial habitat by using a 15 metre buffer around the edges of water bodies.

Toxicity

Moderate acute toxicity. Acute oral LD₅₀ (rat) = 886 mg/kg. Severely irritating to eyes and moderately irritating to skin. May cause burns upon contact with skin and eyes. Intake can cause kidney failure and liver damage.

Storage

Heated storage is necessary. Store in original container, tightly closed in a safe place away from children.

Remedy EC/Remedy MSO



Caution Poison

Group 4

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Remedy EC (PCP # 26420)	Dow	Triclopyr: 480 g/L	Emulsifiable concentrate	2 X 10 L jug
Remedy MSO* (PCP # 28430)	AgroSciences			

* Remedy MSO is a new formulation that has a Methylated Seed Oil (MSO) adjuvant build into the formulation.

Crops and Staging

Crop	Staging
Pasture and rangeland	Apply based on a weed stage.

Weeds Controlled and Staging

Apply when weeds and woody plants are actively growing. Applications can commence once leaves are fully expanded and continue until 10 days prior to the first signs of autumn colouration.

Annual and perennial broad leaf weeds

burdock	dandelion	ragweed	vetch
chicory	field bindweed	smartweed	wild lettuce
curled dock	lamb's-quarters	smooth bedstraw	

Woody Plants

alder	blackberry	elderberry	poplar
ash	buckthorn	elm*	raspberry*
aspen	cherry*	maples	sumac
basswood	chokecherry*	oaks*	tamarack
beech	cottonwood	pinus*	wild rose
birch	dogwood	poison oak	willow

*These species may require treatment at the higher rate and may need to be retreated in the following year, particularly if the initial treatment was made at the lower rate.

Rate

Ground Applications

Foliar Applications: Non-woody species (annual and perennial weeds): 0.4 - 1.62 L/acre. Woody species: 1.6 - 3.2 L/acre.

Basal Bark Applications: Mix 0.04 - 0.8 per 10 L of spray solution.

Backpack Applications: 0.1 - 0.5 L/10 L of spray solution.

Aerial Applications: 1.62 - 3.2 L/acre.

Application Information

With: Apply with ground equipment (Boom, Radi-arc, OC Nozzles, handgun or backpack) or by air. Ground applications are recommended.

Water volume: 80 L/ac or more.

Application Tips

Foliar application: Weeds and brush should be actively growing. Best results occur when uniform coverage occurs. Higher application volumes (80 L/ac or more), depending on the application system, provide the desired uniformity of coverage. The key to successful application is even, uniform application. For woody plants exceeding 2.5 metres, cut and spray regrowth or use basal bark treatment. Use higher rates for species listed as hard to control. Use higher rate for late summer application when plant growth rates are reduced. If lower rates are used on hard to control species, resprouting may occur and treatment may be necessary the following year.

Remedy EC/Remedy MSO (cont'd)

Streamline basal bark treatment: Use 20 or 30 L of Remedy in enough mineral oil diluent to make 100 L of spray mixture. Use on stems that are 8 cm in basal diameter. Apply sufficient spray to form a band 5 cm wide. If stems are 8 - 15 cm in diameter, treat both sides of the stem so that a 5 cm wide band is treated. Direct spray to a point on the stem 30 - 50 cm above ground level. Old rough bark may require more spray than smooth young bark. To control resprouting of cut stumps of woody species, mix 20 - 30 L of Remedy in enough mineral oil to make 100 L of spray mixture. Apply with a backpack sprayer using a flat fan or a solid cone nozzle. Thoroughly wet outer portion of the cut surface adjacent to the cambium and the sides of the stumps, including the root collar area, but not to the point of runoff. Apply bark treatments at any time including winter months, except when snow or water prevents spraying to the ground line. Care must be given to ensure treatment of all cut stems in a clump.

How it Works

Interferes with cell division and elongation, causing leaf cupping, stem distortion and eventual death. Remedy is absorbed through leaves and stems of susceptible plants.

Expected Results

Within 1 or 2 weeks of treatment, leaves of treated vegetation display cupping and browning. Within the first season, smaller twigs and stems become brittle and die.

Restrictions

Rainfall: Rain within 2 hours of application may cause poor results to occur.

Grazing/Pre-harvest Intervals: Treated areas may be grazed by livestock or harvested for livestock feed provided that the following intervals are adhered to:

Lactating dairy animals: Up to 1.9 L/ac - Do not feed for 14 days following treatment. 1.9 - 3.2 L/ac - Do not feed for 60 days following treatment.

Other livestock: Up to 1.9 L/ac - No restriction. 1.9 - 3.2 L/ac - Do not feed for 14 days following treatment.

Note: If less than 25% of grazed area is treated, there is no grazing restriction (for other livestock only).

Haying (harvesting of dried forage):

Lactating dairy animals: Do not feed hay that has been harvested within 60 days of treatment.

Other livestock: Up to 1.9 L/ac - Do not harvest hay for 7 days following treatment. 1.9 - 3.2 L/ac - Do not harvest hay for 14 days following treatment.

Slaughter Withhold: Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days prior to slaughter.

Environmental Precautions

Remedy is highly toxic to fish, aquatic plants and aquatic invertebrates and is not labelled for application to water surfaces. Keep out of wetlands, lakes, ponds, streams, rivers and wildlife habitats at the edge of bodies of water by using an adequate buffer.

Leaching: This chemical may leach where soils are permeable or where the water table is shallow.

Toxicity

Moderate acute toxicity. Acute oral LD₅₀ (male rats) = technical triclopyr 729 mg/kg; Formulated product = 2,460 mg/kg.

Storage

Store in a cool, dry place above -2°C. If stored below -2°C, agitate before use.

Restore



Warning Poison

Group 4

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Restore A (PCP #28551)	Dow	Aminopyralid: 240 g/L	Emulsifiable concentrate	3 L jug
Restore B (PCP # 28552)	AgroSciences	2,4-D amine: 564 g/L		2 x 7.65 L jugs

Crops and Staging

Crop	Staging
Permanent grass pasture and rangeland	Apply based on a weed stage.

Weeds Controlled, Staging and Rate

Apply in spring or early summer, after weeds have fully emerged and when weeds are actively growing in the vegetative state.

Restore A: 117 mL/acre

Restore B: 606 mL/acre

annual sow thistle	Canada goldenrod**	goat's beard	prickly lettuce
blue lettuce*	Canada thistle**	gumweed*	ragweeds
bluebur	cocklebur	hawkweed	scentless chamomile**
bull thistle*	common plantain	hoary cress*	spotted knapweed**
burdock (<4 leaf)	curled dock (<4 leaf)	peppergrass	stinging nettle
buttercup	flixweed	perennial sow thistle*	sweet clover

Restore A: 154 mL/acre

Restore B: 768 mL/acre

All weeds listed above plus season long control of absinth wormwood, dandelion

Restore A: 202 mL/acre

Restore B: 1.05 L/acre

All weeds listed above plus season long control of western snowberry, common tansy

*Top growth control only.

**Season long control.

Application Information

With: Apply with ground equipment or by air.

Water volume: Ground application - 40 L/ac minimum. Aerial application requires an 8 L/ac minimum water volume.

Application Tips

Apply in spring or early summer after weeds have fully emerged and when weeds are actively growing. Ensure that there is adequate coverage of target weeds. Do not apply under conditions prone to drift (i.e. high winds and temperature inversions).

How it Works

Restore herbicide interferes with cell division causing leaf cupping, stem distortion and eventually death of the plant. Restore is absorbed through the leaves and roots of the plant.

Expected Results

Perennial weeds show distorted stems and cupped leaves, which turn yellow and then brown. Usually, native grass increases in abundance as result of reduced competition. Poor results may be expected if weeds are not actively growing in late summer or as a result of environmental stress such as frost or drought.

Restore (cont'd)**Restrictions**

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage, resulting in reduced weed control. Do not apply if rainfall is forecast for the time of application.

Grazing: Do not allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Do not harvest forages or cut hay within 30 days of application.

Re-cropping: If legumes are essential in a pasture, do not use Restore. Do not break up treated pasture and plant to sensitive broadleaf crops for at least 3 years after application of Restore.

Environmental Precautions

Restore is toxic to small wild mammals, birds, aquatic organisms and non-target terrestrial plants. Do not directly spray or allow the spray to drift onto sensitive terrestrial habitats. When applying by ground sprayer, leave a 10 metre buffer zone between application area and sensitive terrestrial and aquatic habitats. When apply by air, leave a 70 - 175 metre buffer zone.

Runoff: Avoid contamination of aquatic areas by runoff through the use of the recommended buffer zones.

Leaching: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Restore A - Acute oral toxicity is low. Acute oral LD₅₀ (rat) = 5,000 mg/kg.

Restore B: Moderate acute oral toxicity. Acute oral LD₅₀ (rat) = 949 mg/kg.

Storage

Store in a cool, dry place. Do not freeze. If frozen, warm to room temperature and mix thoroughly before using.

Retain

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Retain (PCP # 29570)	Viterra	50 % Thifensulfuron methyl 25 % Tribenuron methyl	Dry flowable	320 g net content (4 X 80 g water soluble bags)
Attain A (PCP# 24834)		180 g/L Fluroxypyr	Emusifiable concentrate	4.8L
Attain B (PCP# 24833)		564 g/L 2,4-D LV ester	Emusifiable concentrate	8L

This product treats 40 acres per case

Crops and Staging

Crop	Stage	Rate
Spring wheat	Post-emergent application; 4-leaf to flag leaf (shot blade)	Retain: 8 g/acre
Durum		Attain A: 0.120 L/acre
Barley		Attain B: 0.20 L/acre

Weeds

Weed Staging: Apply Retain when weeds are less than 10 cm in height or in diameter, unless otherwise noted:

Broad-leaved weeds controlled

ball mustard	cow cockle	narrow-leaved hawk's-beard	stinkweed
Canada thistle	corn spurry	redroot pigweed	volunteer flax
chickweed (emerged only; 1 - 6 leaf)	hemp-nettle	Russian thistle	volunteer sunflowers
cleavers	kochia	shepherd's-purse	wild buckwheat
common groundsel	lady's-thumb	smartweed	wild mustard
	lamb's quarters	sow-thistle	

Broad-leaved weeds suppressed

round-leaved mallow (2 - 6 leaf)	scentless chamomile	stork's bill (2 - 6 leaf)	toadflax
----------------------------------	---------------------	---------------------------	----------

**Important notes or exceptions

1. Apply when chickweed is small (1-6 leaf) and actively growing, but before canopy prevents thorough herbicide coverage of weeds.
2. Apply when the majority of thistles have emerged and are actively growing. For best top growth control, apply before bud stage when thistles are no larger than 15 cm in height. A single application will effectively inhibit the ability of emerged thistles to compete with the crop.
3. If the product is used without a wild oat herbicide, add a non-ionic surfactant such as Ag-Surf at a rate of .2% v/v (2L/1000 L of spray solution).

Tank Mixes

Foothills, WildCat, Avert, Everest Herbicide, Horizon, Puma¹²⁰ Super or Puma Advance, Assert.

Application Information

How to Apply: Ground equipment only. Do not apply by air.

Water Volume: Apply at 5-10 gal/acre rate.

Tank mixing order: Check label for tank mix instructions.

Application Tips

Effectiveness of Retain may be reduced if it remains in the tank for more than 24 hrs. If Retain is tank mixed with Avert or Assert, it needs to be used within 12 hrs in order to remain effective. Application to crops that are stressed by severe weather conditions or environmental stress, disease or insect damage may result in crop injury. Under certain conditions, such as heavy rainfall, prolonged cool weather, frost or wide fluctuations in day/night temperatures, temporary lightening in crop colour and occasionally, a slight reduction in crop height may occur.

Restrictions

Rainfall: Rainfall within 4 hours of application of Retain will result in reduced weed control.

Grazing: Wheat or spring barley may not be grazed or fed to livestock or to lactating dairy animals within 7 days of application. Do not harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days prior to slaughter.

Pre-harvest Interval: Do not harvest the treated mature crop within 60 days after application.

Re-cropping Restrictions: Canola, flax, lentils and alfalfa may be planted two months after an application of Retain. Any crop may be planted in the year following the use of Retain.

Environmental Precautions

This product contains a petroleum distillate which is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems. Toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. Observe buffer zones. Do not spray exposed roots of trees and ornamentals. The use of chemical may result in contamination of the ground water particularly where soils are permeable (e.g. sandy soils) and/or the depth to the water table is shallow.

Storage

Store product in original container. If product is frozen, bring to room temperature and agitate before use.

Reward



Warning Poison

Group 22

Formulations

Product	Company	Active ingredient	Formulation	Container size
Reglone (PCP # 26271)	Syngenta Crop Protection	Diquat:240 g/L	Liquid	4 x 3.78 L

Aquatic use: Weed control in still or slow moving water of farm ditches, farm dugouts, farm ponds, lakes and canals.

Weeds Controlled, Staging and Rate

Weed	Staging	Rate
Water weeds: Canada waterweed, coontail, duckweed, pondweeds, water milfoil Algae: <i>Cladophora</i> , <i>Spirogyra</i> , and <i>Pithophora</i> sp. (temporary control)	Apply only after weeds are visible and in an active stage of growth which is normally sometime in late May through June as growth is dependent on water temperatures.	For areas less than 1.5 m (5 feet) deep: 7.4 L/acre. For areas more than 1.5 m (5 feet) deep: 10 - 11.8 L/acre. Calculating area to be treated: length (m) x width (m) ÷ 10,000 m ² x 2.47 = acres.

Application Information

How to Apply: For floating weeds, use surface application: Dilute one part Reward with at least four parts clean water and spray over water surface. Apply from the banks of small bodies of water.

For submerged weeds, inject below the water surface: A suction type of boat bailer is mounted on the cavitation plate of an outboard motor and the end of the inlet tube inserted into a solution containing one part Reward diluted with at least 10 parts of clean water (a backpack sprayer may also be used). Make lines of travel at regular intervals through the water (3 m or less apart) over the area to be treated until the whole area has received a uniform application.

Application Tips

Do not apply to muddy water and do not agitate water excessively during one or two days after treatment as the effectiveness of the chemical will be reduced. Use clean water for diluting the chemical. Do not use wetting agents or surfactants for water treatment. Repeat treatment may be necessary if weed growth reappears. Avoid application or drift onto crops or other desirable growth.

How it Works

Reward is a contact herbicide. Thorough coverage on the weeds is essential to ensure satisfactory control. Interferes with photosynthesis.

Expected Results

Control of susceptible weeds generally occurs within 1 - 2 weeks.

Restrictions

Rainfall: None.

Grazing: Do not use treated water for at least 24 hours after treatment for swimming and animal consumption.

Fish Protection: To protect the fish in small lakes and ponds with a dense weed growth, treat not more than 1/4 to 1/3 of the area at one time, otherwise the dying weeds over a large area will cause a serious loss of oxygen which may injure or kill the fish.

Human Consumption and Irrigation: Do not use for at least 5 days after treatment.

Environmental Precautions

Avoid application or drift onto crops, ornamental plants, lawns, grazing areas or other desirable growth. Do not contaminate domestic or irrigation water supplies, lakes, streams and ponds.

Toxicity

Moderate acute toxicity. Acute oral LD₅₀ (rat) = 886 mg/kg. Dermal: Low acute toxicity. May cause burns upon contact with skin and eyes. Intake can cause kidney failure and liver damage.

Storage

Heated storage is necessary. Store in original container.



Caution Poison

Rustler/Tackle

Group 4, 9

Formulations

Product	Company	Active ingredient	Formulation	Container size
Rustler (PCP # 27200)	Monsanto	Glyphosate: 194 g/L + dicamba: 46 g/L	Water soluble liquid	10 L, 115 L, 450 L, 750 L
Tackle (PCP# 29552)	Syngenta Crop Protection Canada	Glyphosate: 140 g/L + dicamba: 70 g/L	Water soluble liquid	160 L, 450 L

Crops and Staging

Pre-seeding barley, corn*, oats, rye and wheat	Apply prior to crop emergence
Chomfallow (chemical summerfallow)	Apply according to weed stage

* For field corn, apply to medium to fine textured soils containing more than 2.5% organic matter. Do not use on sandy or sandy loam soils.

Note: Certain broadleaved crops such as lentils, peas, canola and flax can be injured by a pre-seeding application with this product and so should not be planted to a field receiving this type of treatment

Weeds Controlled, Staging and Rates

Annual weeds		Perennial grasses
Apply @ 1.0 L/acre rate, any time between emergence and heading for annual grasses and when broadleaf weeds are up to 15 cm tall and actively growing		Apply @ 1.26 L/acre, apply before the initiation of seed head or browning of lower leaves
downy brome*	cow cockle	foxtail barley (suppression)
green foxtail	flixweed**	
persian dandelion	kochia	
volunteer cereals	lamb's-quarters	
wild oats	redroot pigweed	
	Russian thistle	
	smartweed (including lady's-thumb)	
	stinkweed**	
	volunteer canola (excluding Roundup Ready)	
	wild mustard	
		Use higher rate when weeds are under stress and poor growing conditions such as drought

* For best control of downy brome, Rustler/Tackle can be applied after emergence in the fall previous to the fallow season or in spring of the fallow season up to seed head emergence.

** For best control of winter annual broadleaf weeds, such as flixweed and stinkweed, 2,4-D should be applied to emerged, actively growing weeds in the fall previous to the fallow season or in early spring in the fallow season when winter annual weeds are less than 10 cm tall.

Rustler/Tackle (cont'd)**Tank Mixes**

Tank mix partner	Tank mix partner rate per acre	Weeds controlled
Prior to seeding of wheat (including durum), winter wheat, barley, and rye		
2,4-D amine or ester	Rustler/Tackle @ 1.0 L/acre + 2,4-D @ 0.2 - 0.3 L/acre	Volunteer Roundup Ready canola up to 4 leaf stage
2,4-D amine or ester	Rustler/Tackle @ 1.0 L/acre + 2,4-D @ 0.4 - 0.5 L/acre	Volunteer Roundup Ready canola up to 6 leaf stage

Application Information

Apply with ground equipment only. Avoid galvanized steel or unlined steel (except stainless steel) spray tanks. Water volume: 20 - 40 L/ac clean water.

Application Tips

Under certain stress conditions such as drought, cool temperatures or where extremely hard water (>700 ppm Ca + Mg) has been used, weed control may be reduced with this product. Under these conditions, lower water volume (20 L/ac) may improve results.

How it Works

A post-emergent herbicide. Glyphosate moves from foliage into roots and kills entire plant. Banvel disrupts cell metabolism.

Expected Results

Visual effects will usually appear within 5 - 7 days. Wilting or yellowing of weeds advances to complete browning of above ground growth and deterioration of affected underground parts.

Restrictions

Rainfall: Heavy rainfall within 2 hours may wash the chemical off the foliage and repeat treatment may be required. Rainfall within 6 hours may reduce effectiveness.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Do not harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Re-cropping: Certain broadleaf crops such as lentils, peas, canola and flax can be injured by a preseeding application of Rustler/Tackle and should not be planted in a field that has been treated with this product.

Environmental Precautions

Rustler/Tackle are toxic to aquatic organisms and non-target terrestrial plants. Avoid contamination of aquatic habitat by leaving a 15 metre buffer zone between the treated area and sensitive terrestrial and aquatic habitats.

Runoff: Prevent runoff by using a buffer zone between treated and sensitive areas. Avoid applying this product when heavy rain is forecast.

Leaching: Leaching is possible in areas of coarse, sandy soils or high water tables.

Toxicity

Glyphosate: Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 4,300 mg/kg; Dicamba. Low toxicity. Acute oral LD₅₀ (rat) = 2,600 mg/kg. Eye irritant. Non-toxic to bees and birds.

Storage

Store above 5°C to keep product in solution. If crystals form, place in a warm room (20°C). Roll or shake solution until crystals have redissolved.

Select/Centurion/ Arrow 240 EC/ Shadow RTM



Caution Poison

Group 1

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Select (PCP # 22625) Plus Amigo (PCP# 22644)	Arysta LifeScience	Clethodim: 240 g/L	Emulsifiable concentrate	3 L
		Surfactant: 30%		9 L
Centurion (PCP# 27598) + Amigo (PCP# 22644),	Bayer CropScience	Clethodim: 240 g/L		3 L
		Surfactant: 30%		9 L
Arrow (PCP# 28224) + X-Act (PCP# 28225)	MANA	Clethodim: 240 g/L		3 L
		Surfactant: 30%		9 L
Shadow RTM (PCP# 29277) + Amigo (PCP# 22644)	Viterro	Clethodim: 240 g/L		3 L
		Surfactant: 30%		9 L

Crops, Staging and Rate

Crops are tolerant at all growth stages with the exception of chickpeas, fenugreek, prairie carnation and coriander, although maximum rates and Pre-harvest Interval must be observed to prevent excess residues in the grain

Maximum Application Rate: Chickpeas and dry beans and prairie carnation - 76 mL/acre

All other crops listed below - 152 mL/acre

alfalfa (seedling)	dry common beans*	flax (including low linolenic acid varieties)	prairie carnation (2 - 5 leaf stage)* ¹
canola	(phaseolus vulgaris)	lentils mustard (oriental, brown)**	soybeans
chickpeas (desi and kabuli before 9 node stage)	dry onions (to a max of 152 mL/year)	mustard (yellow) **	spinach* ¹
coriander* (2 - 5 leaf stage)	fenugreek(3 -5 leaf stage)* ¹	potatoes	sunflowers
	field peas		

* One application per year

¹ Select and Centurion only

Note: Dry common bean varieties may vary in their tolerance to clethodim (Arrow/Centurion/Select/ Shadow). Since not all dry common bean varieties have been tested for tolerance to clethodim, first use of clethodim should be limited to a small area of each variety to confirm tolerance prior to adoption as a general field practice. Additionally, consult your seed supplier for information on the tolerance of specific varieties of dry common beans to clethodim.

Weeds Controlled, Staging and Rates

Weed species	Leaf stage	Rate per acre	Rate of Amigo or X-ACT
Green foxtail, volunteer cereals, wild oats, yellow foxtail	2 - 4 leaf	50 mL	0.5% v/v
Barnyard grass, fall panicum, proso millet, volunteer canary grass, volunteer corn, witch grass			
Barnyard grass, crabgrass, fall panicum, green foxtail, Persian dandel, proso millet, volunteer canary grass, volunteer cereals, wild oats, witch grass, yellow foxtail	2 - 6 leaf	76 mL	0.5% v/v.
Quackgrass (suppression only*)	2 - 6 leaf	76 mL	
Quackgrass control (season-long)	2 - 6 leaf	152 mL	1.0 % v/v

* For quackgrass suppression. Most effective results are achieved when application is made at the 3 to 5 leaf stage, when the canopy is uniform and actively growing.

Select/Centurion/ Arrow 240 EC/Shadow RTM (cont'd)

Tank Mixes

Tank mix partner	Tank mix partner rate	Additional weeds controlled
Flax (including Solin)		
Buctril M	Clethodim @ 76 - 152 mL/acre + Buctril M @ 400 mL/acre + Amigo @ 0.5 % v/v.	Clethodim susceptible weeds plus certain seedling broadleaf weeds. Note: Do not apply this tank mix in hot, humid weather when temperatures are over 25 - 29°C.
Badge (only with Arrow 240)	Clethodim @ 76 - 152 mL/acre + Badge @ 500 mL/acre + Amigo @ 0.5 % v/v.	
Curtail M	Clethodim @ 76 - 152 mL/acre + Curtail M @ 600 - 800 mL/acre + Amigo @ 0.5 % v/v.	
Lontrel 360	Clethodim @ 76 - 152 mL/acre + Lontrel 360 @ 230 - 340 mL/acre + Amigo @ 0.5 % v/v.	Clethodim susceptible weeds plus wild buckwheat and Canada thistle.
MCPA* (not Solin varieties)	Clethodim @ 76 - 152 mL/acre + MCPA ester 600 @ 340 mL + Amigo @ 0.5 % v/v.	Clethodim susceptible weeds plus certain seedling broadleaf weeds.
Canola		
Lontrel	Clethodim @ 76 - 152 mL/acre + Lontrel 360 @ 169 - 335 mL/acre + Amigo @ 0.5 % v/v.	Clethodim susceptible weeds plus wild buckwheat and Canada thistle.
Muster	Clethodim @ 76 mL/acre + Muster @ 8 - 12 g/acre + Amigo @ 0.5 % v/v.	Clethodim susceptible weeds plus wild mustard, stinkweed, green smartweed and redroot pigweed.
CLEARFIELD canola		
Pursuit	Clethodim @ 76 mL/acre + Pursuit @ 40 - 85 mL/acre + Amigo @ 0.5 % v/v.	Chickweed, hempnettle, red root pigweed, stinkweed, volunteer canola (except CLEARFIELD), wild buckwheat, wild mustard plus clethodim susceptible weeds.
Field peas		
Pursuit	Clethodim @ 76 mL/acre + Pursuit @ 85 mL/acre + Amigo @ 0.5 % v/v.	
Liberty Link canola		
Liberty 150 SN	Clethodim @ 25 - 50 mL/acre + Liberty @ 1.1 - 1.35 L/acre + Amigo @ 0.5 % v/v.	Wild oats, volunteer barley, volunteer wheat, volunteer oats plus Liberty susceptible weeds.

* Flax may be treated from 5 cm tall to just before the bud stage.

Application Information

With: Apply with ground equipment only. Do not apply by air.

Water volume: Ground application - 22 - 91 L/acre maximum.

Application Tips

The use of 80° stainless steel flat fan Nozzles tilted 45° forward is recommended for optimum spray coverage. Use high water volumes on dense crop canopies for better penetration to weeds. Best results will occur if applications are made to weeds not stressed by lack of moisture, excessive moisture, low temperature and/or very low relative humidity. Select/Centurion/Arrow/Shadow at 51 mL/acre should only be applied under the following conditions: good crop stand, early application (prior to tillering), light to moderate weed infestation, adequate moisture and fertility, absence of stress, good growing conditions.

How it Works

Select/Centurion/Arrow/Shadow are systemic herbicides that are translocated from the treated foliage to the growing points of leaves, shoots and roots.

Expected Results

Weeds: Leaf foliage will first change from green to yellowish, then purplish and finally a brown colour.

The time required for complete control is 7 - 21 days following treatment, depending on growing conditions and crop competition.

Restrictions

Rainfall: Rainfall within one hour of application may reduce the effectiveness of the spray.

Grazing: Do not cut treated crops for feed or graze until 60 days after application of clethodim to annual crops and 30 days after application to seedling alfalfa.

Pre-harvest Intervals: Canola, coriander, common dry beans, chickpeas (desi, Kabuli), flax (including Solin), lentils, potatoes, and mustard (brown, yellow oriental): 60 days. Alfalfa and fenugreek: 30 days. Sunflower: 72 days. Field peas: 75 days.

Environmental Precautions

Clethodim is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning of equipment.

Toxicity

Low oral toxicity. Acute oral LD₅₀ (male rat) = 2,920 mg/kg.

Storage

Does not require heated storage.



Caution Poison

Sencor

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Sencor Soluak 75 (PCP # 20968)	Bayer CropScience	75%	Water dispersible granules	5 x 0.5 kg bags
Sencor 75 DF (PCP #17242)				4 x 5.0 kg
Sencor 480 (PCP # 26280)		Metribuzin: 480 g/L	Flowable	4 x 5 L Jugs

Crops, Staging and Rate

Crop	Staging	Rate per acre	
		Sencor DF or Sencor Solupak	Sencor 480 Flowable
Barley	2 - 5 leaf stage	81 - 152 g	110 - 225 mL
Spring wheat (including durum)	2 - 5 leaf stage	81 - 152 g	110 - 172 mL
Winter wheat	In the late fall after tillers have developed	226 - 304 g	344 - 453 mL
Field peas	Post-emergence. Up to 15 cm of vine length (single application)	110 - 152 g	172 - 225 mL
	Post-emergence (split application*)	56 - 77 g	85 - 110 mL
	Pre-plant incorporated when tank mixed with Treflan or Edge	See tank mixes section	
Chickpeas	Up to 6 cm in height	110 g	167 mL
Lentils	Post-emergence. Up to 15 cm of vine length	110 g	172 mL
Soybeans	Pre-plant-incorporated, when tank mixed with Treflan		
Fababeans	Pre-plant incorporated when tank mixed with Treflan EC or Edge	See Tank Mixes section	

Sencor (cont'd)

Crop	Staging	Rate per acre	
		Sencor DF or Sencor Solupak	Sencor 480 Flowable
Potatoes	Pre-plant incorporated with Eptam	152 - 222 g	
	Pre-emergence (irrigation) with Eptam	152 - 222 g	
	Early post-emergence. Up to 10 cm	152 g	
Alfalfa grown under irrigation (Sencor 480 only)	In the fall to dormant established stand. Injury may occur to alfalfa if Sencor 480 F is applied earlier than 18 months after seeding.	Not registered	910 mL/acre
Shelterbelts	Pre-plant incorporated - spring. When tank mixed with Treflan EC	Sencor: 161 g + Treflan: 2.1 L	Sencor: 242 mL + Treflan: 2.1 L

* First application followed by second application, 7 - 10 days later in the same range

Weeds Controlled, Staging and Rates

Post-emergence Applications

Barley, wheat (including durum): apply Sencor 480 F at a rate of 111 mL/acre or Sencor 75 DF at a rate of 81 g/acre.

chickweed hemp-nettle (suppression) lamb's-quarter stinkweed
green smartweed lady's-thumb redroot pigweed volunteer canola

Barley, wheat (including durum): apply Sencor 480 F at a rate of 172 - 222 mL/acre or Sencor 75 DF at a rate of 111 - 152 g/acre : all the above weeds plus control of:

ball mustard hemp-nettle, night flowering catchfly tartary buckwheat
common groundsel henbit Russian thistle wormseed mustard
corn spurry

Winter wheat (Norstar only): apply Sencor 480 F at a rate of 344 - 453 mL/acre or Sencor 75 DF at a rate of 226 - 303 g/acre

downy brome flixweed shepherd's-purse stinkweed
Chickpeas, lentils (suppression only) : apply Sencor 480 F at a rate of 167 mL/acre or Sencor 75 DF at a rate of 111 g/acre
ball mustard corn spurry hemp-nettle stinkweed
common chickweed green smartweed lamb's-quarters tartary buckwheat

Field peas: apply Sencor 480 F at a rate of 172 - 222 mL/acre or Sencor 75 DF at a rate of 111 - 151 g/acre
ball mustard corn spurry hemp-nettle stinkweed
common chickweed green smartweed lamb's-quarters tartary buckwheat

Alfalfa (irrigation): apply Sencor 480 F at a rate of 910 mL/acre or Sencor 75 DF at a rate of 610 g/acre
annual sow thistle green foxtail pasture sage shepherd's purse
downy brome kochia redroot pigweed stinkweed
flixweed lamb's-quarters Russian thistle wild oats

Potatoes (irrigated): apply Sencor 480 F at a rate of 222 mL/acre or Sencor 75 DF at a rate of 152 g/acre; do not use post-emergence on varieties Atlantic, Eramosa, red-skinned or any early maturing varieties.

ball mustard green smartweed lamb's-quarter Russian thistle
common chickweed hemp-nettle, night flowering catchfly stinkweed
common groundsel henbit redroot pigweed tartary buckwheat
corn spurry lady's-thumb, Russian thistle

Pre-plant Incorporated Applications

Must be applied in a tank mix with Treflan EC or Rival - check tank mix label for additional weeds and rates.

Tank Mixes - Post Emergence

Tank mix partner	Staging	Sencor rates		Tank mixture partner rate
		Sencor 480 F	Sencor 75 DF	
Barley, spring wheat (including durum) - post-emergence				
2,4-D amine	3 - 5 leaf	81 - 152 mL	111 - 222 g	344 - 445 mL
Banvel II	2 - 3 leaf	81 - 152 mL	111 - 222 g	93 mL
MCPA	3 - 5 leaf	81 - 152 mL	111 - 222 g	344 - 445 mL
Target	2 - 3 leaf	81 - 152 mL	111 - 222 g	405 - 605 mL

Sencor (cont'd)

Tank mix partner	Staging	Sencor rates		Tank mixture partner rate
		Sencor 480 F	Sencor 75 DF	
Field peas - post-emergence				
MCPA (Na-salt)	Vine: 15 cm long	113 mL	77 g	188 mL
Potatoes (irrigation)				
Friam + Adjuvant	-	-	113 - 152 g	24 g + 0.2% v/v

Tank mix partner	Sencor rate (per acre)		Tank mix partner rate (per acre)
	Sencor 480 F	Sencor 75 DF	
Potatoes - pre-plant incorporated			
Eptam	222 - 343 mL	152 - 222 g	1.7 - 2.2 L
Potatoes (sprinkler irrigation) - pre-emergence			
Eptam	222 - 444 mL	152 - 222 g	1.7 - 2.2 L

Application Information

With: Apply with ground sprayer,

Water volume: Post-emergence: Barley, wheat - 40 L/acre. Chickpeas, lentils, peas: 70 L/acre. Pre-plant incorporated (field peas, lentils, faba beans): 40 L/acre. Potatoes - 40 - 120 L. Note: In potatoes, higher rates of water increase crop tolerance.

Incorporation

Be aware of soil organic matter levels when applying Sencor either alone or with a soil incorporated mix with other herbicides. Special conditions may apply.

With irrigation:

Sencor + Eptam: Potatoes: pre-emergence in sprinkler irrigation. Apply specified dosage in 3 - 8 mm of water per acre on a continuous injection in centre pivot systems, or in the last 15 - 30 minutes of set in permanent solid set sprinkler system of self-propelled wheel move systems. On sandy soil, apply in 3 - 5 mm of water and use the lower rate of Sencor and Eptam. Apply pre-emergence to crop and weeds. Use the higher rate for control of grassy weeds or when broadleaf weeds are dense.

Application Tips

Allow 4 - 5 days between application of Sencor and post-emergent wild oat herbicides. Allow 4 - 5 days after frost for crop to recover before applying Sencor. Weed control may be reduced if applied later than the 5-leaf stage of crop. Crop may be sprayed when wet with dew. When incorporated, crop must be planted at least 5 cm below soil surface. Uneven application or improper incorporation of can result in erratic weed control or crop injury depending on rate used.

Stress conditions such as seedling disease, cold weather, deep planting, excessive moisture, high salt concentration, or drought may weaken seedlings and increase the possibility of crop damage from the herbicides. Temporary lightening in colour may occur on the margin of leaves or cotyledons and a slight delay in crop development may be observed. This is quickly outgrown and usually has no lasting effect.

How it Works

A systemic herbicide absorbed by leaves and roots and translocated to new growth. Inhibits photosynthesis and the weed turns brown and dies.

Expected Results

Broadleaf weeds: Initial yellowing 5 - 7 days after application; weeds turn brown and die within 14 - 16 days. Active in soil for a short period and can control new shallow-rooted germinants, like chickweed.

Crops: In extremely hot weather or when frost occurs within 1 - 2 days of application, crop will show some yellowing and slight reduction in height. Discolouration disappears in 7 - 10 days. On Klondike, Johnston, AC

Sencor (cont'd)

Lacombe and Leduc barley varieties, temporary lightening in colour and reduction in height may occur. Lentils and peas provide little competition against weed growth due to their low growth habit. Under heavy weed infestations or lush growth, control may be poor.

Field peas and lentils: Stressful conditions increase the possibility of damage. Temporary lightening on the margins of cotyledons and a slight delay in development may occur. Ensure 70 L/ac water volume is used to reduce crop injury.

Restrictions

Rainfall: Rainfall within 6 hours after application may reduce weed control.

Grazing: Do not graze or feed treated crop to livestock within 30 days of application (lentils, peas: 70 days).

Pre-harvest Interval: Do not harvest barley, wheat or potatoes within 60 days of application. Do not harvest lentils, chickpeas, or field peas within 70 days of application. Do not harvest processing peas or chickpeas within 40 days of application.

Re-cropping: 24 months are required for crops other than potatoes if 910 mL/ac (610 g/ac) is applied on irrigated alfalfa. Canola, celery, cole crops, cucurbits, lettuce, onions, peppers, spinach, sugar beets, sunflowers, table beets and turnips may be injured if planted in soil treated with Sencor during the year of application and the following crop year. Fall seeded or cover crops such as wheat, oats, and rye may be injured when seeded in the same season as the application of Sencor. For pre-plant applications of Sencor + Treflan or Edge, oats, sugar beets, creeping red fescue and small-seeded grasses (e.g. timothy, canary seed) should not be planted the following crop year as a precaution.

Environmental Precautions

Avoid contamination of water bodies through the use of recommended buffer zones between treated areas and sensitive areas.

Runoff: Use recommended buffer zones to prevent runoff.

Leaching: Leaching is possible with permeable soils and areas with a high water table. Metribuzin may reach surface water bodies including streams and reservoirs under heavy rainfall conditions.

Toxicity

Moderate oral toxicity. Acute oral LD₅₀ (male/female combined rat) = 1,471 mg/kg. Mild skin irritant.

Storage

No damage by freezing but avoid large temperature fluctuations. Store in a cool, dry place.

Signal D

Caution Poison

Group 1, 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Signal (PCP# 29172)	Nufarm Agriculture Inc	Clodinafop-propargyl: 240 g/L	Emulsifiable concentrate	1.84 L, 2 x 18.4 L
Approve (PCP# 28123)		Bromoxynil: 225 g/L + 2,4-D ester: 225 g/L		10 L, 2 x 100 L
Signal Adjuvant (PCP# 29173)		Surfactant blend: 17%		6.4 L, 2 x 64 L

Crops and Staging

Crop	Stage
Spring wheat (including durum)	4 leaf to early flag leaf stage

Weeds and Staging

Grassy weeds 1 - 5 leaf stage unless stated otherwise.

barnyard grass
green foxtail (prior to emergence
of 3rd tiller)

Persian damel
volunteer canaryseed: 1 - 6 leaf stage
(max 3 tillers)

wild oats: 1 - 6 leaf stage (max 3 tillers)
yellow foxtail: (prior to emergence of
3rd tiller)

Broadleaf weeds

Weeds controlled at 1 - 4 leaf stage unless stated otherwise.

American nightshade
ball mustard
bluebur
cocklebur
common groundsel*
common ragweed
cow cockle
flixweed

green smartweed
kochia**
lady's thumb
lamb's-quarters*
night-flowering catchfly
pale smartweed
redroot pigweed
Russian thistle**

shepherd's-purse
stinkweed*
tame buckwheat*
tartary buckwheat*
wild buckwheat*
volunteer canola
volunteer sunflower
wormseed mustard*

*Weeds controlled at 1 - 8 leaf stage

**Weeds controlled to a maximum of 5 cm tall.

Tank Mixes

None.

Application Information

How to Apply: With ground equipment or aircraft.

Signal: 93 - 117 mL/acre

Approve: 0.5 L/acre

Signal Adjuvant: 0.5% v/v or 1 L per 200 L of water

Water volume: Ground: 20 - 40 L per acre. Aerial: minimum 14.2 L/acre.

Application Tips

For optimum results, apply to actively growing weeds. An early application will maximize crop yields by reducing weed competition. Do not apply to crop that is stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result. Application before the 4-leaf stage may injure the crop.

How it Works

Thorough coverage of the plants is essential for consistent control. Signal herbicide is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Approve contains two components, bromoxynil and 2,4-D. Bromoxynil is a contact type herbicide, which inhibits photosynthesis and plant respiration. 2,4-D is a hormone type herbicide, which causes abnormal growth, affects respiration, food reserves and cell division in broadleaf plants. Absorbed primarily by leaves and stems and translocated to the growing tips and roots.

Expected Results

Small burn spots on the leaf can appear within hours. Death takes up to 2 weeks. **Grassy weeds:** Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within one to three weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and complete control 3-5 weeks after application.

Restrictions:

Rainfall: Rainfall within 2 hours of application may reduce weed control.

Grazing: Do not graze or cut for livestock feed within 30 days of application. Withdraw meat animals 3 days before slaughter.

Pre-harvest Interval: Do not harvest within 30 days of application.

Re-cropping: No re-cropping restrictions the year after application.

Environmental Precautions

Toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants.

Runoff: Avoid contamination of aquatic areas and sensitive terrestrial areas by using the recommended buffer zones.

Signal D (cont'd)

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Approve: Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 606 mg/kg. Intake of a large dose may cause convulsions, sudden collapse and coma. Can be absorbed through the skin. Very toxic to fish. Signal herbicide: Acute oral LD₅₀ (rats) = 2,276 mg/kg.

Storage

Approve will solidify at temperatures below -20°C but will become useable at temperatures above 0°C.



Caution Poison

Signal M

Group 1, 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Signal (PCP # 29172)	Nufarm Agriculture Inc	Clodinafop-propargyl: 240 g/L	Emulsifiable concentrate	1.84 L, 2 x 18.4 L
Mextrol (PCP # 26999)		Bromoxynil 225g/L + 225 g/L MCPA		10 L, 2 x 100L
Signal Adjuvant (PCP# 29173)		Surfactant blend: 17%		6.4 L, 2 x 64 L

Crop and Staging

Crop	Stage
Spring wheat (including durum)	2 leaf to early flag leaf

Weeds and Staging

Grass weeds 1 - 5 leaf prior to tillering unless otherwise noted.

barnyard grass	Persian darnel	wild oats: 1 - 6 leaf stage (max 3 tillers)
green and yellow foxtail: 1 - 5 leaf stage (prior to emergence of 3rd tiller)	volunteer canaryseed: 1 - 6 leaf stage (max 3 tillers)	

Broadleaf weeds: Controlled at 1 - 4 leaf stage unless otherwise noted.

American nightshade	green smartweed	shepherd's-purse
ball mustard	kochia (< 5 cm tall)	stinkweed**
bluebur	lady's-thumb	tartary buckwheat**
Canada thistle (suppression)*	lamb's-quarters**	velvetleaf
cocklebur	night-flowering catchfly	volunteer canola
common buckwheat**	pale smartweed	volunteer sunflower
common groundsel**	perennial sow-thistle (suppression)*	wild buckwheat**
common ragweed**	redroot pigweed	wild mustard**
cow cockle	Russian thistle (< 5 cm tall)	wild tomatoes*
flixweed	scentless chamomile	wormseed mustard**

*Weeds controlled 1 - 6 leaf stage

**Weeds controlled 1 - 8 leaf stage

Tank Mixes

None.

Application Information

How to apply: With ground equipment or aircraft

Signal: 93 - 117 mL/acre

Mextrol: 0.5 L/acre

Signal M (cont'd)

Signal Adjuvant: 0.8% v/v or 0.8 L per 100 L of water

Water volume: Ground: minimum 20 - 40 L per acre. Aerial: minimum 12 L/acre.

Application Tips

For optimum results, apply to actively growing weeds. An early application will maximize crop yields by reducing weed competition. Do not apply to crop that is stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result. Application before the 4-leaf stage may injure the crop. Thorough coverage of the plants is essential for consistent control.

How it Works

Signal herbicide is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Approve contains two components, bromoxynil and 2,4-D. Bromoxynil is a contact type herbicide, which inhibits photosynthesis and plant respiration. 2,4-D is a hormone type herbicide, which causes abnormal growth, affects respiration, food reserves and cell division in broadleaf plants. Absorbed primarily by leaves and stems and translocated to the growing tips and roots.

Expected Results

Small burn spots on the leaf can appear within hours. Death takes up to 2 weeks. Grassy weeds: Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within one to three weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and complete control 3-5 weeks after application.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce weed control.

Grazing: Do not graze or cut for livestock feed within 30 days of application. Withdraw meat animals 3 days before slaughter.

Pre-harvest Interval: Do not harvest within 60 days of application.

Re-cropping: No re-cropping restrictions the year after application.

Environmental Precautions

Toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants.

Runoff: Avoid contamination of sensitive aquatic and terrestrial areas as a result of runoff by using the recommended buffer zones between the treated area and sensitive sites. Do not irrigate within 24 hours after application

Leaching: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Approve: Moderate acute mammalian toxicity. Acute oral LD_{50} (rats) = 606 mg/kg. Can be absorbed through the skin. Very toxic to fish. Signal herbicide: Acute oral LD_{50} (rats) = 2,276 mg/kg.

Storage

Store the product in closed, original container in a well ventilated room.



Warning Poison

Simplicity

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Simplicity (PCP # 28887)	Dow AgroSciences	Pyroxsulam: 30 g/L	Oil dispersion	2 x 8 L

One case treats 80 acres

Simplicity (cont'd)**Crop and Staging**

Crop	Staging
Spring, winter and durum wheat	Apply to actively growing wheat from the 3-leaf stage to the first node stage.

Note: Occasionally slight yellowing or height reduction may be observed in the treated crop. These transient symptoms disappear within 14 days with no reduction to yield. Do not apply to crops suffering from drought, nutrient deficiency or exposed to frost or other agronomic factors affecting plant growth

Weeds Controlled and Staging: At the 200 mL/acre Rate

barnyard grass (1 - 5 leaf stage)	hemp-nettle (1 - 8 leaf)	wild oats (up to 4 leaf, 2 tillers)
common chickweed (up to 10 cm)	lady's-thumb (1 - 5 leaf)	volunteer canola (excluding CLEARFIELD)
cleavers (up to 6 whorls)	Japanese brome (1 - 6 leaf)	yellow foxtail (1 - 5 leaf)
downy brome** (1 - 6 leaf)	red root pigweed (1-8 leaf)	
green foxtail* (1 - 5 leaf)	wild buckwheat* (1 - 4 leaf)	

* Suppression

** Fall application in winter wheat will give control; spring application will suppress downy brome.

Rate

Simplicity: 200 mL per acre. 150 mL/ac on spring and durum wheat when mixed with Attain XC or Benchmark under conditions of low wild oat populations.

Assist Oil Concentrate: 0.8% v/v. (0.8L/100 L) of spray solution.

Note: Use surfactant only when Simplicity is applied alone or when tank mix partner requires a surfactant. Add either Assist oil concentrate at 0.8 L per 100 L of spray solution or Agral 90, AgSurf or Surf 92 at 0.25v/v (0.25 L per 100 L of spray solution).

Tank Mixes

Do not add Assist Oil Concentrate when tank mixing Simplicity with registered broad leaf herbicides, unless otherwise indicated.

Tank mix partner	Tank mix partner rate	Additional weeds controlled
Attain*	Simplicity @ 200 mL/acre + Attain XC A @ 95 mL/acre + Attain XC B @ 340 mL/acre	See Attain XC label.
Buctril M	Simplicity @ 200 mL/acre + Buctril M @ 404 mL/acre	See Buctril M label.
Benchmark*	Simplicity @ 200 mL/acre + Benchmark A @ 40 mL/acre + Benchmark B @ 485 mL/acre	Consult individual labels for Benchmark A & Benchmark B.
Curtail M	Simplicity @ 200 mL/acre + Curtail M @ 600 mL/acre	Canada thistle (season-long).
Frontline XL	Simplicity @ 200 mL/acre + Frontline XL @ 506 mL/acre	Consult Frontline XL label.
Frontline 2,4-D	Simplicity @ 150 - 200 mL/acre + Frontline 2,4-D A @ 27 mL/acre + Frontline 2,4-D B @ 248 mL/acre	Wild buckwheat (1-7 leaf) + 2,4-D ester susceptible weeds.
MCPA LV ester 500	Simplicity @ 200 mL/acre + MCPA ester 500 @ 280 - 450 mL/acre	Wild buckwheat. Use 450 mL/acre rate for larger weeds or heavy infestation.
Prestige XC	Simplicity @ 200 mL/acre + Prestige XC "A" @ 130 mL/acre + Prestige XC "B" @ 600mL/acre	Wild buckwheat (1- 9 leaf), Russian thistle (2 - 10 cm high).
Spectrum	Simplicity @ 200 mL/acre + Spectrum A @ 40 mL/acre + Spectrum B @ 600 mL/acre	Consult Spectrum label for additional weeds controlled.
Thumper	Simplicity @ 200 mL/acre + Thumper @ 405 mL/acre	Consult label.

*Under low wild oat populations (<75 plants/sq metre), can use a lower rate of Simplicity at 152 mL/ac when mixed with these products.

Application Information

How to apply: Apply with ground equipment or by air.

Water volume: 20 - 40 L/ac ground application, 20 L/ac aerial application.

Simplicity (cont'd)

Application Tips

Only weeds emerged at time of application are controlled. For optimum results, apply Simplicity to actively growing seedling weeds. Weed control may be reduced if Simplicity is applied under stress conditions. Do not apply to crops that are stressed as crop injury may result. Under conditions of low crop competition and high weed density or wet foliage at time of application, control may be reduced.

How it Works

Simplicity inhibits the production of the ALS enzyme in plants. This enzyme is essential for the production of certain amino acids, which are essential for plant growth.

Expected Results

Simplicity rapidly stops the growth of susceptible weeds. However, typical symptoms (discolouration) of dying weeds may not be noticeable for 1 - 3 weeks following application, depending on growing conditions and weed susceptibility. Degree of control and duration of symptoms depend on weed sensitivity, weed size, crop competition, growing conditions following treatment and spray coverage.

Restrictions

Rainfall: Rain within 4 hours of application may reduce control.

Grazing: Livestock may be grazed on treated crops 7 days following application

Pre-harvest Interval: Do not harvest the treated crop within 60 days after application.

Re-cropping: Eleven months following an application of Simplicity, the following crops can be seeded: barley, brown mustard, canola, dry bean (of the species *Phaseolus vulgaris*), flax, canola quality Brassica juncea, lentils, oats, field peas, chickpea, spring wheat, soybean and yellow mustard or summerfallowed.

Environmental Precautions

Simplicity is toxic to aquatic organisms and non-target terrestrial plants. Avoid contamination of these sensitive areas by using the recommended buffer of 1 metre from water bodies and 2 metres from sensitive terrestrial areas.

Drift: Do not allow spray mist to drift.

Toxicity

Low oral toxicity. Acute LD₅₀ (rats) = >3,129 mg/kg. May cause moderate skin irritation.

Storage

Store in original container in a secure, dry, heated storage. This product will freeze at -10°C. Do not store below -9°C. Allow product to warm above 7°C before using and thoroughly mix the product prior to use.



Warning Irritant

Solo

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
Solo (PCP #25496, 28741, 28742)	BASF Canada	Imazamox: 70%	Water dispersible granules	4 x 117 grams

Note: Surfactant is not included in a package.

Solo (cont'd)**Crop and Staging**

Crop*	Staging
CLEARFIELD canola	2 - 6 leaf stage
CLEARFIELD Xceed canola	
CLEARFIELD lentils	
CLEARFIELD sunflower	2 - 8 leaf stage
Field peas	1 - 6 true leaf stage
Dry beans**	After 3rd trifoliate stage

*Initial transient crop yellowing may be observed after application but this is outgrown and should not affect yield.

**Only use on dry beans when mixed with Basagran Forte + 2% v/v UAN tank mix.

Weeds Controlled and Staging

@ 11.7 g/acre unless otherwise noted.

Grasses: 1 - 4 true leaf stage up until early tillering.

barnyard grass	volunteer canary seed	wild oats
green foxtail	volunteer cereals	yellow foxtail
Japanese brome*	volunteer wheat (excluding volunteer CLEARFIELD wheat)	
Persian dandel		

Broadleaves: cotyledons - 4 leaf stage

cleavers*	lamb's-quarters*	stinkweed
cow cockle	redroot pigweed	volunteer canola (excluding CLEARFIELD)
green smartweed	round-leaved mallow*	wild buckwheat*
kochia* (excluding Group 2 resistant biotypes)	Russian thistle	wild mustard†
	shepherd's purse	

* Suppression only.

† Note: Recent surveys of kochia in Alberta have found 90% of fields contain kochia that are resistant to Group 2 herbicides. Without testing, assume kochia in your field is resistant to Group 2 herbicides and use other herbicides groups to control kochia.

Rates

Solo: 11.7 g/acre

Merge Adjuvant: 0.5% v/v (5.0 L of Merge per 1,000 L of spray solution)

Note: Merge is not included in the package and is sold separately

Acres treated per 4 x 117 pack = 40 acres

Tank Mixes

Tank mix partner	Tank mix partner rate	Additional weeds controlled
Field peas		
Basagran Forte	Solo @ 17.2 g/acre + Basagran Forte @ 361 mL/acre + 808 nitrogen source (UAN: 28%)	Volunteer CLEARFIELD canola, wild mustard (including Group 2 resistant types), volunteer lentils (including Clearfield types) and cleavers (including Group 2 resistant types).
Dry beans		
Basagran Forte	Solo @ 11.7 g/acre + Basagran Forte @ 500 mL/acre + 2% v/v UAN 28%	Volunteer CLEARFIELD canola, wild mustard (including Group 2 resistant types) and suppression of spiny annual sow thistle.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: 40 L/ac.

Solo (cont'd)

Application Tips

Water soluble bags will dissolve better when kept intact; do not split bags. If agitation is stopped for more than 5 minutes, re-suspend spray solution by full agitation prior to commencing spraying again. Do not spray Solo if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below 5°C) will prevent optimum herbicide performance, as weeds are not actively growing. Initial transient crop yellowing may be observed after application, but this is outgrown and should not affect yield.

How it Works

Absorbed by foliage and roots. Disrupts plant metabolism causing growth to stop. Works best under good growing conditions.

Expected Results

Susceptible weeds stop growing within 24 - 48 hours. Yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks.

Restrictions

Rainfall: Do not spray if there is a forecast of rain during or soon after application as the rain may reduce control.

Grazing: Do not graze treated crop or cut for feed within 20 days of application. Do not graze treated sunflower plants or cut for straw; sufficient data are not available to support such use.

Pre-harvest Intervals: Do not harvest the treated crop within 60 days of application.

Re-cropping: Barley, canaryseed, all types of canola, chickpeas, CLEARFIELD lentils, corn, sunflowers (incl CLEARFIELD varieties), field peas, flax, lentils, oat, spring wheat (including durum) may be seeded the first spring after application. Condiment mustard can be seeded 2 years after treatment. The company recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above. Contact manufacturer for additional information on recropping intervals.

Environmental Precautions

Solo is highly toxic to aquatic plants and non-target terrestrial plants. Leave at least an 11 metre buffer strip between the point of application and sensitive aquatic and terrestrial habitats. Avoid runoff.

Toxicity

Low acute oral toxicity. Acute oral LD₅₀ (rats) = 5,000 mg/kg. Non-toxic to fish, birds and bees.

Storage

Store at temperatures above 5°C. Keep unused water soluble bags in resealed, original container. Keep packages dry at all times.

Spectrum

Caution Poison

Group 2, 4

Formulations

Each case of Spectrum contains two components: Spectrum A and Spectrum B

Product	Company	Active ingredient	Formulation	Container size
Spectrum A (PCP # 27031)	Dow	Florasulam: 50 g/L	Suspension	0.8 L
Spectrum B (PCP # 27032)	AgroSciences	Clopyralid: 50 g/L + MCPA ester:	E.C	12 L

Spectrum (cont'd)

Crop and Staging

Crop	Staging
Barley	2 - 6 leaf.
Spring wheat (including durum)	
Forage grasses (seedling and established for seed production): fescue (chewing, creeping red, hard), wheat grass (crested and intermediate, tall), bromegrass (smooth, meadow and hybrid), perennial rye grass, timothy	No stage specified on the label.

Weeds Controlled and Staging

Annual broadleaf weeds: Apply at 1 - 4 leaf stage, unless otherwise stated.

Canada thistle and perennial sow thistle: Apply after all thistles have emerged and when the majority are in the rosette to pre-bud stage.

annual sow thistle	flixweed (spring seedlings only)	smartweed
Canada thistle	hemp-nettle	stinkweed
chickweed	lamb's-quarters	stork's-bill
cleavers	perennial sow thistle (top growth control)	volunteer canola (all varieties)
dandelions (spring seedlings and over-wintered 15 cm)*	redroot pigweed	wild mustard
	shepherd's purse	wild buckwheat

* Suppresses dandelions greater than 15 cm across and mature plants

Rate

Spectrum A: 40 mL/acre; Spectrum B: 600 mL/acre.

Tank Mixes

Tank mix partner	Tank mixture rate	Adjuvant	Additional weeds controlled
Barley, spring wheat (including durum)			
Assert 300 SC	647 mL/acre	Aciculate: 2.5 kg/10.8 L of Assert	Wild oat.
Barley and spring wheat (excluding durum)			
Axial 100 EC + Adigor	243 mL/acre	Adigor @ 283 mL/acre	Wild oats and green foxtail.
Spring wheat (including durum)			
Everest	17.4 g/acre	Ag-Surf or Agral 90 @ 0.25 % v/v	Barnyard grass, green foxtail, yellow foxtail, proso millet, volunteer canary seed, wild oats.
Simplicity	200 mL/acre	None required	Grass and broadleaf weeds consult label.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: 40 L/ac.

Application Tips

Do not apply to crops underseeded to legumes. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and regrowth may occur. For best results, ensure adequate spray coverage of the target weeds.

How it Works

Spectrum tank mix is a combination of Group 2 and Group 4 herbicides. Group 2 herbicides inhibit the production of the ALS enzyme in plants. This enzyme is essential for the production of certain amino acids that are essential for plant growth. Group 4 herbicides are synthetic auxins, which act at multiple sites in the plant to disrupt hormone balance and protein synthesis and thereby cause a variety of plant growth abnormalities.

Spectrum (cont'd)**Expected Results**

The weeds susceptible to florasulam will stop growing almost immediately. The weeds turn yellow or reddish. Symptoms such as yellowing and red coloration may not be noticeable for 1 - 2 weeks. Twisting of stems may also be observed on weeds sensitive to Curtail M. Warm, moist conditions, small weed size and a competitive crop will optimize weed control provided by Spectrum.

Restrictions:

Rainfall: Do not apply if rainfall is expected within 6 hours.

Grazing: Do not permit any grazing within 7 days after application. Do not harvest forage or cut hay within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Intervals: Do not harvest the treated crop within 60 days after application.

Re-cropping: Fields previously treated with Spectrum herbicide can be seeded the following year to barley, canola, field peas, oats, or wheat or fields can be summerfallowed. Seed only those crops listed above in the year following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application, delay seeding field peas an additional 12 months (total 22 months following application).

Environmental Precautions

Spectrum A is highly toxic to aquatic organisms on an acute basis. It is slightly toxic to birds. A buffer zone of 30 metres is required between the application area and sensitive aquatic and terrestrial habitats. Do not contaminate these habitats when cleaning and rinsing spray equipment or containers.

Toxicity

Spectrum A has extremely low acute toxicity. Acute LD_{50} = >5,000 mg/kg. Spectrum B (Clopyralid and MCPA) has low acute toxicity. Acute LD_{50} rats = >2,000 mg/kg. MCPA has moderate acute toxicity. Acute LD_{50} of technical = (700 - 800 mg/kg).

Storage

Store in a dry, heated storage. If products are frozen, bring to room temperature and agitate before use.

Stellar

Danger Poison

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
GF134 (PCP# 29286)	Dow AgroSciences Canada Inc.	Florasulam @ 2.5 g/L + Fluroxypyr @ 100 g/L	SC	2 X 8.0 L
Stellar B (PCP# 29165)	Dow AgroSciences Canada Inc.	MCPA Ester (600 g/L)	EC	9.33

Treat 40 acres per case of Stellar.

Crops and Staging

spring and durum wheat, barley

2 leaf to expanded 6 leaf

Weeds Controlled, Rates and Staging

Weed stage: Apply when weeds are actively growing (2-4 leaf stage). Only weeds emerged at the time of treatment will be controlled. Best results are obtained from applications made to seedling weeds. Follow all precautions, directions for use, and limitations on the tank-mix partner labels.

Stellar (cont'd)

Rates: Stellar A: 400 mL/ac + Stellar B: 240 mL/ac.

Weeds Controlled

burdock	lamb's-quarters	shepherd's purse	wild buckwheat
chickweed	plantain	stinkweed	wild mustard
cleavers	prickly lettuce	sunflower(annual	wild radish
cocklebur	ragweed	vetch	
flixweed	red root pigweed	volunteer canola	
kochia*	Russian pigweed	volunteer flax	

* Includes ALS resistant biotypes.

Tank Mixes

Herbicide tank mix partner	Crops registered	Rate of herbicide tank mix partner	Remarks (adjuvant rate, crop staging and any other restrictions)
Assert 300 SC	Spring wheat, durum wheat and spring barley	640 mL/acre	Add tank-mix partners in the following order: Stellar A, Spray Water pH Adjuster, Assert 300 SC, Stellar B.
Axial 100 EC	Spring wheat and spring barley	240 mL/acre + Adigor @ 280 mL/acre	See label for mixing instructions.
Everest Solupak 70DF Herbicide	Spring wheat and durum wheat	17.2 g/acre + non-ionic surfactant @ 0.25%v/v	See label for mixing instructions.

Application Information

Water volume: Ground equipment only (40 L/acre).

How it Works

Stellar is readily absorbed by weed foliage. The florasulam component inhibits the ALS enzyme in plants resulting in a rapid halt in plant growth followed by yellowing, most noticeable after 1-2 weeks. The fluroxpyr and MCPA components mimic plant growth regulators causing swelling and thickening and twisted weed growth followed by yellowing and browning, resulting in plant mortality.

Expected Results

Weeds start to discolour and twist shortly after application. Plant growth will cease or become erratic followed by browning and plant mortality.

Restrictions

Rainfall: Do not apply if rainfall is expected within 2 hours of application.

Re-cropping: Fields previously treated with Stellar can be seeded the following year to barley, canola, oats, peas, or wheat or fields can be summerfallowed.

Grazing: Do not cut the treated crop for hay or graze treated crop within 7 days after application.

Pre-harvest Intervals: Do not harvest the treated crop within 60 days after application.

Leaching: This product has potential to leach. Do not apply excessive irrigation.

Buffer zone: Use a buffer zone of 30 metres between area applied and sensitive terrestrial and aquatic habitats.

Toxicity

For Stellar A, the oral LD₅₀ for rats is >2,000 mg/kg (males). Stellar B has moderate acute toxicity. LD₅₀ of technical = 700-800 mg/kg.

Storage

Store in original containers in a secure, dry heated storage. If product is frozen, bring to room temperature and agitate before use.

Target/Sword/Tracker XP



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Target (PCP # 28028)	Syngenta Crop Protection	MCPA: 275 g/L + Mecoprop-P: 62.5 g/L + Dicamba: 62.5 g/L	Solution	2 x 10 L, 160 L
Sword (PCP # 27892)	United Agri Products			
Tracker XP (PCP # 27790)	IPCO			

Crops and Staging

Crops	Staging	Specific remarks
Barley	2 - 4 leaf	Do not underseed to legumes. For wheat, oats and barley, a maximum of 1 application is permitted per year. For canary seed, a maximum of 2 applications are permitted per year, with a minimum retreatment interval of 90 days.
Canary seed, oats, spring wheat (including durum)	2 - 5 leaf	
Winter wheat	Apply in the spring before the crop is more than 30 cm high (top leaf extended).	
Summerfallow or fall stubble (Canada thistle control program)	Summerfallow: Early bud stage Fall Stubble: 15 - 20 cm tall or across.	

Note: Applications made later than the recommended timing may result in flattening of the crop and shortening of the straw (particularly under stress conditions).

Target and Sword only

Apply at 2 - 4 leaf stage

Seedling and established grasses grown for forages

creeping red fescue	intermediate wheatgrass	orchard grass	timothy
crested wheatgrass	meadow foxtail	smooth brome grass	

Established grasses grown for forages

kentucky bluegrass	meadow fescue	slender wheatgrass	tall wheatgrass
meadow brome grass	pubescent wheatgrass	tall fescue	western wheatgrass

Weeds Controlled and Staging

Apply at 2 - 3 leaf stage and actively growing for best results unless otherwise stated

annual sow thistle	green smartweed	perennial sow thistle*	volunteer rapeseed
ball mustard	hedge bindweed*	prostrate pigweed	volunteer sunflower
Canada thistle*	hemp-nettle (before 2nd pair	redroot pigweed	volunteer tame buckwheat
cleavers (1 - 2 whorls)	of true leaves)	Russian thistle (<5 cm high)	wild buckwheat
common ragweed	knotweed	shepherd's-purse	wild mustard
corn spurry	kochia	stinkweed	wormseed mustard
cow cockle	lady's-thumb	tall mustard	yellow mustard
field bindweed*	lamb's-quarters	tame buckwheat	
flixweed	night flowering catchfly	tartary buckwheat	

* Top growth control only

Rate

400 - 600 mL/acre.

Target/Sword/Tracker XP (cont'd)**Tank Mixes**

Tank mix partner	Tank mix partner rate	Additional weeds controlled
Spring wheat (including durum)		
Horizon NG	Target/Sword/Tracker XP @ 400 - 600 mL/acre + Horizon NG @ 376 mL/acre	Wild oats and green foxtail. Target only registered for this mix.
Wheat and barley		
Lorox	Target/Sword/Tracker XP @ 400 - 600 mL/acre + Lorox @ 172 mL/acre	Chickweed.
Sencor	Target/Sword/Tracker XP @ 400 - 600 mL/acre + Sencor @ 111 - 172 mL/acre	Chickweed.

Application Information

With: Apply with ground sprayers or by air.

Water volume: Ground application: 40 L/ac. Aerial application: 12 L/ac (minimum).

Application Tips

In winter wheat, spray winter annuals as soon as growth begins in spring. Use the 600-mL/acre rate when weeds are not actively growing due to extended periods of hot and dry, or cold and wet, weather prior to or following application or when weeds are beyond the 3-leaf stage or for heavy weed infestation. Do not let contents stand for long periods in the tank. Agitate every 8 hours.

How it Works

A combination of 3 systemic hormonal herbicides that accumulate in the growing point of susceptible plants, produce abnormal growth and disrupt the transport system in plants.

Expected Results

Weeds: Can take up to 7 - 14 days depending on weather and growing conditions. Leaves curl, leaf edges turn brown, petioles twist, plant ceases growth and turns brown and dies.

Crop: Improper or untimely application can result in abnormal bending at the nodes of grain stalks, difficulty in head emergence from sheath, curled awns, malformed kernels and sterile florets. Under certain conditions, straw shortening may occur but yield will not be affected. Poor results may be expected if there is poor coverage, or weeds are too advanced.

Restrictions

Rainfall: Rainfall within 3 hours will reduce activity.

Grazing: Do not graze within 7 days of application, and do not cut for forage or hay within 30 days.

Pre-harvest Intervals: Leave at least 60 days from application to harvest.

Re-cropping: Cereal and broadleaf crops can be grown the year following application.

Environmental Precautions

Target/Sword/Tracker XP are toxic to aquatic organisms and non-target terrestrial plants. Avoid contamination of aquatic systems during application.

Runoff: Reduce the risk of runoff from treated areas into sensitive aquatic and terrestrial habitats by using the recommended buffer zones, 1 metre from aquatic habitats and 5 metres from sensitive terrestrial habitats when ground applied.

Leaching: Leaching is possible in areas where soils are permeable (e.g. sand, loamy sand and sandy loam soils) and/or the depth to the water table is shallow.

Toxicity

Target: Slightly acutely toxic. Acute Oral LD₅₀ (rat) = 1,750 mg/kg.

Sword: Slightly acutely toxic. Acute Oral LD₅₀ (rat) = 1,188 mg/kg.

Tracker XP: Slightly acutely toxic. Acute Oral LD₅₀ (rat) = 1,400 mg/kg.

Storage

Heated storage only.

Telar

Caution Poison

Group 2

Herbicides

Formulations

Product	Company	Active ingredient	Formulation	Container size
Telar (PCP # 21533)	E.I. duPont Canada	Chlorsulfuron: 75%	Dry flowable	5 x 100 grams

Non-crop Areas

Total vegetation control programs on railroads, utility, highway rights-of-way, airports, plant sites, storage areas, and petroleum storage areas.

Weeds Controlled, Staging and Rates

Apply when weeds are small (less than 10 cm tall or across) and actively growing.

Weeds controlled at 6 g/acre + 2,4-D amine @ 320 - 450 mL/acre

annual sunflower	hemp-nettle	plantain	stinkweed
ball mustard	kochia	prickly lettuce	stork's-bill
common ragweed	lady's-thumb	redroot pigweed	sweet clover
cow cockle	lamb's-quarters	Russian pigweed	volunteer rapeseed
flixweed	narrow-leaved hawk's-beard	Russian thistle	wild mustard
green smartweed	(spring seedlings)	shepherd's-purse	

Weeds controlled at 12 g/acre alone

common chickweed	flixweed	lamb's-quarters	shepherd's-purse
common groundsel	green smartweed	prickly lettuce	stork's-bill
corn spurry	hemp-nettle	redroot pigweed	volunteer rapeseed
cow cockle	lady's-thumb	scentless chamomile	wild mustard

Weeds controlled at 16 g/acre alone: Weeds controlled at 12 g/acre plus wild carrots**Weeds controlled at 28 g/acre alone: Weeds controlled at 16 g plus following**

Canada thistle*	horsetail	Russian thistle	wild strawberry*
dandelions*	kochia**	sweet clover	
golden rod*	perennial sow thistle*	wild rose*	

Broadleaf weed control in non-crop land (where vegetation is not desirable): Weeds controlled at 48 g/acre alone

Canada thistle	horsetail	perennial sow-thistle*	wild strawberry*
dandelion	narrow-leaved hawk's-beard	wild buckwheat	willow*
goldenrod*		wild rose*	

* Suppression

**A recent survey of kochia fields has found 90% of kochia populations that are Group 2 herbicide resistant. Without testing to confirm, assume the kochia in your field is resistant and will not be controlled by this product alone.

Note: Addition of recommended surfactant (Ag-Surf, Agral 90, Citowett, Companion or Super Spreader) @ 0.1% v/v may improve control of weeds growing under adverse conditions.

Tank Mixes

Tank mix partner	Tank mixture rate	Remarks
Krovar + non-ionic surfactant	Telar @ 48 g/acre + Krovar @ 2.75 - 3.6 kg/acre + Non-ionic surfactant @ 1% v/v.	Apply when weeds are small (less than 10 cm tall)

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: Not less than 40 L/ac. Spray volumes of 80 - 160 L/ac are recommended.

Telar (cont'd)**Application Tips**

Select a spray volume that will ensure thorough coverage and uniform spray pattern. Best results are obtained when weeds are actively growing.

How it Works

Absorbed through the roots and foliage. Inhibits cell elongation.

Expected Results

Telar rapidly inhibits growth of susceptible weeds. Typical symptoms (discolouration) of dying weeds may not be noticeable for 1 - 3 weeks after application depending on growing conditions and weed susceptibility. Degree of control and duration of effect depend on the following factors: rate used, weed sensitivity and weed size, growing conditions at and following treatment, precipitation, soil organic matter and pH.

Restrictions

Rainfall: Rainfall within 2 hours may lessen degree of weed control. For best results, sufficient rainfall to move Telar 5 - 7 cm deep into the soil is required after application before weeds develop an established root system and grow beyond the seedling stage.

Environmental Precautions

Telar is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified under Directions for Use on the label.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast.

Toxicity

Slightly acutely toxic. Acute Oral LD₅₀ (rat) = 3,053 mg/kg. Slightly to moderately toxic by contact.

Storage

Store in a cool, dry place.



Caution Poison

Tensile

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Solo (PCP#28741)	BASF Canada	Imazamox	70% dispersable granule	4 x 117.5 gm
Lontrel Dry (PCP# 27306)	Dow AgroSciences	Clopyralid	75% dispersable granule	2 x 809.6 gm

One package treats 40 acres.

Note: Merge adjuvant required but not supplied.

Crops and Staging

Crop	Stage	Rate per acre
CLEARFIELD canola	2 to 6 leaf stage	11.7 g/acre of Solo + 40 gm/acre of Lontrel + Merge adjuvant at 5.0 L/1000 L of spray solution

Weeds Controlled, Rates and Staging

Weed stage: Leaf stage, unless otherwise noted in the weed table.

Tensile (cont'd)

Rates**Weeds Controlled****Grassy weeds 1 - 4 main stem leaves, early until tillering**

barnyard grass	volunteer barley	volunteer wheat (not CLEARFIELD varieties)	yellow foxtail
green foxtail	volunteer canaryseed	wild oats	
Persian dandel	volunteer oats		

Broadleaf weeds - cotyledon to 4 leaf stage

annual sow thistle	kochia***	shepherd's-purse	wild buckwheat*
Canada thistle**	lamb's-quarter	stinkweed	wild mustard
cleavers*	perennial sow thistle**	volunteer canola (not CLEARFIELD varieties)	
cow cockle	red root pigweed	vetch	
green smartweed	Russian thistle		

* Suppression only

** Top growth control only.

***Prairie-wide surveys of kochia fields have found 90% of kochia populations are resistant to Group 2 herbicides. Without testing, assume kochia in your field is resistant and will not be controlled by this product alone.

Tank Mixes

None.

Application Information**Water volume:** Ground (40 L/acre).**Application Tips**

Do not spray Tensile if temperatures of +5°C or lower are forecasted within 3 days of application. Temperatures near freezing (below -5°C) will prevent optimum herbicide performance, as weeds are not actively growing.

How it Works

Lontrel (clopyralid) is a systemic, hormone-type herbicide. It is absorbed by leaf and stem surfaces and is readily translocated leading to swollen growing points and roots, cupping of leaves, twisted and distorted stems and leaves. Maximum efficacy results from foliar application to young, actively growing plants. Solo is absorbed by foliage and roots. It disrupts plant metabolism causing growth to stop. Works best under good growing conditions.

Expected Results

Plants will gradually stop growing and change colour, first to dark green and then to yellow before turning brown as they die. Death of weeds may not occur until 14 - 21 days after application. With this lowest rate of Lontrel on Canada thistle, some regrowth may occur by the end of the season, but this will not interfere with harvesting of the crop. Solo causes susceptible weeds to stop growing within 24 - 48 hours. Yellow striping and purplish or reddish discolouration of the leaves may occur. Leaves begin to die in 3 - 10 days starting with the youngest and moving to the older leaves. Death of the plant may occur in 1 - 3 weeks.

Restrictions

Rainfall: Do not spray if there is a forecast of rain during or soon after application as the rain may reduce control.

Re-cropping: Fields treated with Tensile can be seeded to barley, canola, flax, mustard, oats, rye, wheat or summerfallowed. Do not seed to crops other than those listed above for at least one year after treatment.

Use of straw and manure from treated crops: Lontrel residues in straw may be harmful to susceptible plants. Do not use straw from treated crops for composting or mulching on susceptible broadleaf crops. Manure can be spread on fields that will be seeded to barley, flax, oats, canola (rapeseed), rye or wheat. Do not grow susceptible crops such as peas, beans, lentils, potatoes, sunflowers or other sensitive crops on land that has been mulched with straw containing Lontrel 360 residues within the last 12 months.

Grazing Restrictions: Do not graze treated crop or cut for feed within 20 days of application.

Environmental Precautions

Drift: Small amounts of drift may damage sensitive plants such as legumes.

Tensile (cont'd)**Toxicity**

Solo has low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 5,000 mg/kg. Non-toxic to fish, birds and bees. Lontrel has very low acute mammalian toxicity. Acute oral LC₅₀ (rats) = >2,000 mg/kg. Extremely low toxicity to fish.

Storage

Store in heated storage; if product is frozen, bring to room temperature and agitate before use.



Warning Poison

Thumper/Approve/Thrasher/Leader

Group 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Thumper (PCP # 22659)	Bayer CropScience	Bromoxynil: 280 g/L + 2,4-D: 280 g/L	Emulsifiable concentrate	2 x 8 L, 128 L
Approve (PCP # 28123)	Nufarm Agriculture	Bromoxynil: 225g/L + 2,4-D ester: 225 g/L		10 L, 100 L, 500 L
Thrasher (PCP # 28779)	MANA			2 x 10 L, 500 L
Leader (PCP # 28853)	IPCO			10 L, 115 L, 450 L

Crop and Staging

Crop	Staging
Barley, spring wheat (including durum)	4 leaf to early flag leaf

Weeds Controlled, Rate and Staging**Weeds controlled at 1 - 4 leaf stage**

American nightshade	common ragweed	lady's-thumb	shepherd's-purse
ball mustard	cow cockle	night flowering catchfly	volunteer canola
bluebur	flixweed	pale smartweed	volunteer sunflower
cocklebur	green smartweed	redroot pigweed	

Weeds controlled at 1 - 8 leaf stage

common groundsel	lamb's-quarters	tartary buckwheat	wild mustard
common buckwheat	stinkweed	wild buckwheat	

Weeds controlled at 1 - 12 leaf stage

kochia (5 cm tall)	Russian thistle (5 cm tall)
--------------------	-----------------------------

Rate

Thumper: 405 mL/acre (one 8 L jug treats 20 acres)

Approve/Thrasher/ Leader: 500 mL/acre (one 10 L jug treats 20 acres)

Tank Mixes

Tank mix partner	Tank mix partner rate	Specific comments
Barley, spring wheat (including durum)		
Achieve Liquid + Turbocharge Adjuvant	Achieve Liquid @ 200 mL/acre + Turbocharge @ 0.5% v/v	Apply from the 4 leaf to early flag leaf stage. Application before the 4 leaf stage may injure the crop.
Avenge	Achieve Liquid @ 1.4 - 1.7 L/acre	Apply from the 4 to 6 leaf stage. Wild oats must be in the 3 to 5 leaf stage.

Tank mix partner	Tank mix partner rate	Specific comments
Barley, spring wheat (including durum)		
Bengal, Puma Advance, Thrasher, Leader*	Fenoxaprop-p ethyl @ 150 -310 mL/acre, 412 mL/acre with Puma Advance	Wheat: Apply from 4 - 6 leaf stage on the main stem + 3 tillers. Barley: Apply from 4 - 6 leaf stage on the main stem + 3 tillers.
Spring wheat (including durum) only		
Horizon NG*, NextStep NG* (no adjuvant needed), Signal (adjuvant needed)	Horizon NG/NextStep NG @ 376 mL Signal @ 93 - 117 mL/acre + 0.8% v/v of Signal adjuvant	Apply from 4 leaf to flag leaf stage.
Spring wheat (excluding durum)		
Everest + Ag-Surf or Agral 90 (Approve herbicide only)	Approve @ 500 mL/acre + Everest @ 17.4 g/acre + Ag-Surf or Agral 90 @ 0.25 % v/v.	Apply from 4 - 6 leaf stage (4 leaf on the main stem plus 2 tillers).

*Only Thumper and Approve are registered for this tank mix. Check labels for tank mix partners.

Application Information

How to Apply: Apply with ground equipment or by air.

Water volume: Ground application: 20 - 40 L/ac. Aerial application: 12 - 16 L/acre. Use the higher volume when majority of weeds are cow cockle, pigweed or smartweed or there is a heavy crop canopy.

Application Tips

Do not treat cereals underseeded with forages. For best results, spray when weeds are in the seedling stage and actively growing. Application before the 4 leaf stage may injure the crop.

How it Works

Bromoxynil is a contact type herbicide; therefore, good spray coverage is essential. Inhibits photosynthesis and plant respiration. 2,4-D is a hormone type herbicide which causes abnormal growth, affects respiration, food reserves and cell division in broadleaf plants. Absorbed primarily by leaves and stems and translocated to the growing tips and roots.

Expected Results

Small burn spots on the leaf can appear within hours; death takes up to 2 weeks.

Restrictions

Rainfall: Rainfall within 2 hours of application may reduce weed control.

Grazing: Do not graze or harvest for greenfeed until 30 days after treatment. Withdraw meat animals 3 days before slaughter.

Pre-harvest Intervals: Do not harvest within 30 days of application.

Re-cropping: There are no re-cropping restrictions the year after application.

Environmental Precautions

Bromoxynil + 2,4-D is toxic to small mammals, birds, aquatic organisms including fish and non-target terrestrial plants. Avoid contamination of sensitive aquatic and terrestrial systems during application by using appropriate buffer zones.

Runoff: Avoid contamination of aquatic areas by using buffer zones.

Leaching: This chemical may leach into groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or depth to the water table is shallow.

Toxicity

High acute toxicity. Acute oral LD₅₀ (rat) = 361 mg/kg. Slightly to moderately toxic by contact. Moderately irritating to skin and severely irritating to eyes.

Storage

Does not require heated storage.

Titanium



Warning Poison

Group 1, 4, 6

Formulations

Product	Company	Active ingredient	Formulation	Container size
Achieve Liquid (PCP # 27011)	Nufarm Agriculture	Tralkoxydim: 400 g/L	Emulsifiable concentrate	4 L, 90 L
Approve (PCP # 28123)		Bromoxynil: 225 g/L + 2,4-D ester : 225 g/L		10 L 2 X 112.5 L
Turbocharge (PCP # 23135)		Surfactant blend: 39.5%	Solution	4 L, 90 L

Crop and Staging

Crop	Staging
Barley, spring wheat (including durum)	4 leaf to early flag leaf

Weeds Controlled and Staging

Grasses

Weeds	Staging
barnyard grass	1 - 4 leaf (total leaves including tillers)
persian damel	
green foxtail	1 - 5 leaves (total leaves including tillers), (maximum 2 tillers)
yellow foxtail	
volunteer tame oats	1 - 6 leaf stage (total leaves including tillers), with a maximum of 2 tillers
wild oats	

Broadleaf

Weeds controlled at 1 - 4 leaf stage

American nightshade
ball mustard
bluebur
cocklebur
common buckwheat
common ragweed

cow cockle
flixweed
green smartweed
lady's-thumb
night flowering catchfly
pale smartweed

redroot pigweed
shepherd's-purse
volunteer canola
volunteer sunflower

Weeds controlled at 1 - 8 leaf stage

common groundsel
lamb's-quarters

stinkweed
tartary buckwheat

wild buckwheat
wild mustard

Weeds controlled at 1 - 12 leaf stage

Russian thistle

kochia

Application Information

How to Apply: With ground equipment or aircraft.

Achieve Liquid: 200 mL/acre.

Approve: 500 mL/acre.

Turbocharge: 0.5 L/100 L of spray solution.

One case treats 20 acres.

Water volume: 20 - 40 L/ac.

Titanium (cont'd)

Hard water: Add ammonium sulfate at 0.75 - 1.5 kg /100 L (7.5 - 15 lb/100 gallons) of water when water analysis indicates bicarbonate (BCO_3) levels are 400 ppm or greater.

Note: Titanium must be sprayed within the same day of mixing.

Application Tips

Weed control: Optimum weed control is obtained by applying herbicides when targeted weeds are actively growing. When applied to crops under stress (drought, heat, frost, poor soil fertility, flooding or prolonged cool temperatures), weed control may be delayed or reduced.

Crop safety: Tillered cereal crops may incur injury if Titanium is sprayed within 48 hours of freezing temperatures.

How it Works

Achieve is a systemic herbicide that is absorbed through the leaves and translocated to the growing points within the plant where it starts killing the susceptible grasses. Thorough coverage of the foliage is important for consistent grass control. Approve contains two components: bromoxynil and 2,4-D. Bromoxynil is a contact-type herbicide; therefore, good spray coverage is essential. Inhibits photosynthesis and plant respiration. 2,4-D is a hormone-type herbicide that causes abnormal growth, affects respiration, food reserves and cell division in broadleaf plants. It is absorbed primarily by leaves and stems and translocated to the growing tips and roots.

Expected Results

Grass weeds: Growth stops in 48 hours. Young shoots turn brown in 7 - 8 days. Complete death of plant will take 2 - 3 weeks.

Broadleaf weeds: Small burnt spots on the leaf can appear within hours; death takes up to two weeks.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce weed control.

Grazing: Do not graze or harvest for greenfeed until 30 days after treatment. Withdraw meat animals 3 days before slaughter.

Pre-harvest Intervals: Do not harvest within 30 days of application.

Re-cropping: There are no re-cropping restrictions the year after application.

Environmental Precautions

Achieve Liquid is practically non-toxic to aquatic organisms, birds and bees. Bromoxynil + 2,4-D is toxic to small mammals, birds, aquatic organisms and non-target terrestrial plants. Avoid contamination of aquatic and sensitive terrestrial systems through the use of the recommended buffer zones.

Runoff: Prevent runoff from treated areas into aquatic habitats.

Leaching: This product may contaminate groundwater through leaching, particularly in areas where soils are permeable (e.g. sandy soil) and/or depth of water table is shallow.

Toxicity

Achieve Liquid: Low oral toxicity. Acute oral LD_{50} (rat) = 2,950 mg/kg. Low dermal toxicity.

Approve: High oral toxicity. Acute Oral LD_{50} (rat) = 361 mg/kg. Slightly to moderately toxic by contact. Very toxic to fish.

Storage

Store in a cool, dry place above -5°C .

Tordon 22 K



Warning Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Tordon 22 K (PCP # 9005)	Dow AgroSciences	Picloram: 240 g/L	Solution	2 x 10 L

Note: Available only through selected retail outlets.

Crops and Staging

Rangeland, permanent grass pastures and non-cropland. For spot treatment on cultivated cropland (when applied by authorized pesticide applicators). Apply at any stage of permanent grass pastures, rangeland and non-cropland.

Note: Legumes are susceptible to Tordon 22K. Do not spray pastures containing forage legumes unless the kill of such legumes can be tolerated.

Weeds Controlled, Rate and Staging

Apply any time when green fully developed leaves are present.

Weeds	Rate	Acres treated per 10 L container
scentless chamomile	0.45 L/acre	20
diffuse or spotted knapweed	0.91 L/acre	11
poverty weed Canada thistle pasture sage, perennial sow thistle Russian knapweed	1.8 L/acre	5
leafy spurge field bindweed toadflax	3.6 L/acre	2.5

Application Information

With: Apply with ground sprayers, backpack sprayers or handgun. See label for application information for a backpack sprayer.

Water volume: 160 - 324 L/ac.

Application Tips

Tordon 22K used as a spot treatment in a crop. No spot treatment should exceed 1 acre, and the total area treated in any 1 field in a year should not exceed 5% of the field. Tordon 22K is persistent. It will carry over in soil. Treated soil should not be moved out of the treated area. Tordon 22K is very difficult to clean from sprayers. Use a different sprayer for applying other materials to desirable plants or crops. Handguns equipped with proportioning devices and reservoirs for Tordon 22K are useful in preventing sprayer contamination.

How it Works

Interferes with cell division, causing leaf cupping, stem distortion and eventual death of plant. Tordon 22K is absorbed through leaves and roots.

Expected Results

Tordon 22K: Perennial weeds show distorted stems and cupped leaves, which turn yellow and then brown. Usually native grass increases in abundance as a result of reduced competition.

Restrictions

Rainfall: Heavy rainfall shortly after application may cause poor results.

Grazing: Do not graze treated area by dairy animals within 6 weeks after treatment. Clippings from grass or crops which have been treated with Tordon 22K should not be used for composting or mulching, nor should the manure from animals grazing treated areas or fed treated forage be used around susceptible plants.

Re-cropping: Picloram may persist in the soil for a period of up to five years; therefore, it should not be used in those areas where sensitive broadleaved crops such as sunflowers and potatoes are grown in the rotations. Where wheat, oats or barley are the major crops in the rotations, the following cropping sequence is suggested to start the year after treatment.

First year	Oats
Second year	Oats or barley
Third year	Oats or barley or wheat

Environmental Precautions

Tordon 22k is moderately toxic to fish. Do not apply to any water bodies or in areas where the runoff from treated areas will reach fish-bearing waters. Do not contaminate water through spray drift, by cleaning of equipment or disposal of wastes. Tordon 22K may cause damage to sensitive non-target vegetation. Do not apply to irrigation ditches that contain or may contain water to be used for irrigation or domestic purposes.

Leaching: Picloram is highly mobile in the soil and will readily move with water. Do not apply to soils that are very permeable (textures of sandy loam to sand) throughout the entire profile and which also have an underlying shallow aquifer. Do not apply to soils containing sinkholes over limestone bedrock. Do not apply to soils whose surfaces are composed of severely fractured rock or unconsolidated gravel and underlaid with an aquifer.

Toxicity

Low oral toxicity. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. Low dermal toxicity.

Storage

Store in a cool, dry place. Do not freeze. If freezing occurs, bring to room temperature and mix thoroughly.

Traxos

Group 1

Formulations

Product	Company	Active ingredient	Formulation	Container size
Traxos (PCP# 29855)	Syngenta Crop Protection Canada	Pinoxaden: 25 g/L + Clodinafop propargyl@25 g/L	Emulsifiable concentrate	2 x 10 L, 80 L

Crops and Staging

Crop	Stage	Rate
Spring and durum wheat	Prior to 4th tiller (do not apply past flag leaf)	500 mL/acre

Note: Traxos contains a built-in adjuvant system, DO NOT add any adjuvant to the Traxos herbicide mixture

Traxos (cont'd)**Weeds and Staging**

Grassy weeds controlled: 1 - 6 leaf on main stem, prior to emergence of 4th tiller. Wild oats, tame oats, volunteer canaryseed, proso millet.

barnyard grass (1 - 5 leaf on main stem)
green foxtail (1 - 5 leaf on main stem)

Persian dandel (1 - 5 leaf on main stem)
proso millet

yellow foxtail (1 - 5 leaf on main stem)

* Important notes or exceptions

For optimum results, apply Traxos herbicide to actively growing weeds. An early application will maximize crop yields by reducing weed competition. Weeds emerging after application of Traxos herbicide will not be controlled.

Tank Mixes

Tank mix partner	Product rates	Crop stage ¹
Buctril® M ^{4, 5}	404 mL/acre	2 leaf to flag leaf
Curtail® M ⁴	606 - 810 mL/acre	3 leaf to just before flag leaf
Trophy® Herbicide Tank Mix ^{2, 4}	240 mL/acre of Trophy A + 453 mL/acre of Trophy B	3 leaf to flag leaf
Prestige® Herbicide Tank Mix ^{2, 4}	243 - 324 mL/acre of Prestige A + 606 - 810 mL/acre of Prestige B	3 leaf to flag leaf
Benchmark® Herbicide ^{4, 5}	40 mL/acre of Benchmark A + 486 mL/acre of Benchmark B	2 to 6 leaf
Infinity Herbicide ⁵	336 mL/acre	1 to 5 leaf
Pulsar Herbicide ³	246 - 371 mL/acre	2 to 5 leaf
Pulsar Herbicide ³ + MCPA Ester ⁴ 600 series or 500 series	246 - 371 mL/acre + 234 mL/acre (600) or 283 mL/acre (500)	2 to 5 leaf
MCPA Ester ⁴ 500 series or 600 series	340 - to 445 mL/acre (500) or 283 - 372 mL/acre (600)	3 leaf to flag leaf
Mextrol® 450 Liquid Herbicide ⁴	500 mL/acre	2 leaf to flag leaf
Decis Flowable Insecticide	32 - 48 mL/acre	Prior to emergence of 4th tiller
MATADOR® 120EC	26 - 33 mL/acre	Prior to emergence of 4th tiller
TILT® 250E Fungicide	101 - 202 mL/acre	Prior to emergence of 4th tiller

¹ Always consult the label of the broadleaf herbicide, insecticide or fungicide prior to use.

² Rates above 2.0 L/ha may cause crop injury.

³ Refer to broadleaf tank-mix label for list of weeds controlled at low and high use rates.

⁴ A reduction in barnyard grass control may be observed when Traxos herbicide is tank mixed with these broadleaf herbicides.

⁵ A reduction in green foxtail control may be observed when Traxos herbicide is tank mixed with these broadleaf herbicides.

Application Information

Water Volume: Ground: 20-40 L/acre. Aerial: 12 L/acre.

Application Tips

When tank-mixing Traxos herbicide with a tank-mix partner, ensure you read the tank-mix partner label for minimum water recommendations. For optimum control, apply Traxos herbicide to actively growing weeds, ideally at the 2-3 leaf stage. An early application will maximize crop yields by reducing weed competition.

Weed control under stress conditions can be reduced or delayed. Do not apply to crop that is stressed by conditions such as frost, low fertility, drought, flooding, disease or insect damage as crop injury may result.

How it Works

Traxos herbicide is absorbed by the leaves and is rapidly translocated to the growing points of leaves and stems. Thorough coverage of the plants is essential for consistent control.

Expected Results

Actively growing susceptible grasses stop growing within 48 hours of treatment. Depending on species, growing conditions and crop competition, leaves and growing points turn yellow within one to three weeks after application. Further colour changes and loss of vigour will be observed, followed by a browning and complete control three to five weeks after application.

Traxos (cont'd)

Temporary crop injury may occur with tank mixes under extreme weather conditions or when the crop is suffering from stress due to inadequate or abnormally high moisture levels or extreme temperatures.

Restrictions

Rainfall: Traxos herbicide alone can be used one hour before rainfall.

Grazing: Observe a minimum of 7 days before grazing livestock.

Pre-harvest Interval: 60 days after treatment for grain and straw and 30 days after for hay.

Re-cropping Restrictions: There are no crop limitations the year following application of Traxos.

Environmental Precautions

This product is toxic to aquatic organisms and non-target terrestrial plants. Leave a 1 metre buffer between treated area and sensitive vegetation and aquatic habitats.

Toxicity

Low toxicity. Pinoxaden: Acute oral LD₅₀ (rat) = 3,129 mg/kg. Clodinafop-propargyl: Acute oral LD₅₀ (rat) = 2,276 mg/kg.

Storage

Store the product in closed, original container in a well ventilated room.



Caution Irritant



Caution Poison

Trifluralin

Group 3

Formulations

Product	Company	Active ingredient	Formulation	Container size
Bonanza 10G (PCP# 22744)	United Agri-Products	10%	Granules	22 kg bag, 500 kg bulk bag
Bonanza 480 EC (PCP# 28289)	United Agri-Products	480/L	EC	9.45 L, 205 L
Rival 10 G (PCP# 18926)	NuFarm Agriculture	10%	Granules	22 kg bag, 454 kg bulk bag
Rival EC (PCP# 18612)	NuFarm Agriculture	500 g/L	EC	9 L, 110 L
Treflan EC (PCP# 23933)	Dow AgroSciences	480/L	EC	9.45 L, 115 L

Oilseed and Special Crops**Crops and Staging**

Not all the trifluralin formulations are registered for the crops listed below. Please refer to the specific product label for details. Granules applied in the fall only (after Sept. 1 but before soil freeze-up). All products are for pre-plant-incorporated use only.

alfalfa establishment (flax and canola cover crops only)
asparagus (established - 3 years)
barley (fall only for granular products)
black beans
canola (8.9)

dry common beans (kidney, white)
faba beans
flax (summer and fall only)
forage legumes (seedling
alsike clover, red clover, cicer
milkvetch, bird's-foot trefoil)
lentils (fall only)

peas (field, canning)
safflower
saskatoon berries
soybeans
strawberries
sunflower (8.9)
sweet clover
transplanted shelterbelts

vegetables (broccoli, brussel sprouts, cabbage, cauliflower, carrots, rutabaga, transplanted tomatoes)

Trifluralin (cont'd)**Weeds Controlled**

annual bluegrass
barnyard grass
carpetweed
cheatgrass (downy brome grass)
chickweed

cow cockle
crabgrass
goosegrass
knotweed
lamb's-quarters

millet (green and yellow
foxtail)*
meadow brome grass
Persian damel
pigweed

purslane
Russian thistle
stink grass
wild oats**
wild buckwheat

* Excluding Group 3 resistant foxtails.

** Suppression

Spring Application: Trifluralin can be applied immediately prior to planting or up to three weeks before planting.

Summer Application: Trifluralin can be applied to summerfallow between June 1 and September 1 for weed control in canola or flax the following year. Apply the summer rate and incorporate (see Incorporation section). Not recommended for sand and sandy loam soils. Trifluralin must be incorporated at least twice with the implement operated in two different directions. The initial incorporation must be done within 24 hours after application. The second incorporation (and subsequent incorporations) may be done whenever necessary to destroy resistant weed growth during the remainder of the fallow season. Shallow tillage (5 to 8 cm) is necessary in the spring prior to planting.

Summerfallow: Bonanza 10 G and Rival 10 G can also be applied to summerfallow in May, June or July for weed control during both years of a fallow-wheat rotation or in the fall (September - prior to soil freeze-up) prior to spring and durum wheat seeding.

Crop Year

wild millet (green foxtail and
yellow)*

lamb's-quarters

wild buckwheat

wild oats

Summerfallow year (above weeds as well as)

barnyard grass
cow cockle

Persian damel
red root pigweed

Russian thistle

Fall Application: Trifluralin can be applied in the fall between September 1 and prior to soil freeze-up for weed control the following year. Apply fall rates and incorporate twice. The initial incorporation must be done within 24 hours after application. It is preferred to do both incorporations in the fall followed by tillage (5 to 8 cm) in the spring prior to planting. However, one incorporation may be done in the fall and the second in the spring at the time of seedbed preparation, provided both operations are done at the recommended depth. **Note:** Do not apply to stubble when the previous crop was treated with another trifluralin product (Bonanza, Rival or Treflan). This includes the application the previous summer or fall.

Rates**Spring Applications**

Crop	Soil texture and soil organic matter (%)			
	Light (sand - sandy loam)		Medium - heavy (loam to clay)	
	2 - 6%	6 - 15%	2 - 6%	6 - 15%
Field crops: Black beans, crambe, dry beans (field & kidney), faba beans, mustard, peas (field & canning), canola, safflower, sainfoin, sunflowers				
Bonanza EC	0.69 L/acre	0.69 L/acre	0.93 L/acre	0.93 L/acre
Rival EC	0.65 L/acre	0.89 L/acre	0.89 L/acre	0.89 - 1.13 L/acre
Treflan EC	0.69 L/acre	0.93 L/acre	0.93 L/acre	0.93 - 1.21 L/acre
Shelterbelts: American elm, caragana, green ash, Scotch pine and Siberian elm				
Bonanza EC	1.86 L/acre	3.72 L/acre	3.72 L/acre	3.72 L/acre
Rival EC	1.80 L/acre	3.6 L/acre	3.6 L/acre	3.6 L/acre
Treflan EC	1.9 L/acre			3.75 L/acre

Crop	Soil texture and soil organic matter (%)			
	Light (sand - sandy loam)		Medium - heavy (loam to clay)	
	2 - 6%	6 - 15%	2 - 6%	6 - 15%
Vegetables and berries: strawberries, broccoli, Brussel sprouts, cabbage, cauliflower, carrots, rutabaga, tomatoes (transplanted), snap beans, sweetclover, saskatoon				
Bonanza EC	0.69 L/acre	0.93 L/acre	0.93 L/acre	0.93 - 1.17 L/acre
Rival EC	0.65 L/acre	0.89 L/acre	0.89 L/acre	0.89 L/acre
Treflan EC	0.69 L/acre	0.93 L/acre	0.93 L/acre	0.93 - 1.21 L/acre
Forage Legumes: Alsike clover, red clover, cicer milkvetch, bird's-foot trefoil (seed production and forage)				
Bonanza EC	0.69 L/acre	0.93 L/acre	0.93 L/acre	0.93 L/acre
Rival EC	Not registered	Not registered	Not registered	Not registered
Treflan EC	0.69 L/acre	0.93 L/acre	0.93 L/acre	0.93 L/acre

For use in canola, peas, sunflower, dry beans, mustard, fababeans, seedling alfalfa and seedling sweet clover (spring only)

Products	Soil type	
	Light soils with < 6% organic matter	Medium to heavy soils with 6-15% organic matter
Bonanza 10G	4.45 kg/acre	5.7 - 6.9 kg/acre
Rival 10G	3.44 kg/acre	4.45 - 5.67 kg/acre

For use in flax or lentils (fall only)

Products	Soil type			
	Light soils with < 6% organic matter		Medium to heavy soils with 6-15% organic matter	
	Sand - sandy loam	Loam - clay	Sand - sandy loam	Loam - clay
Bonanza 10G	4.45 kg/acre	4.45 - 5.6 kg/acre	5.67 kg/acre	5.67 - 6.88 kg/acre
Rival 10G		4.45 kg/acre		
Bonanza EC	0.93 L/acre	0.93 L/acre	1.17 L/acre	1.17 L/acre
Rival EC	0.89 L/acre	0.89 L/acre	1.13 L/acre	1.13 - 1.38 L/acre
Treflan EC	0.93 L/acre	1.21 L/acre	1.17 L/acre	1.17 L/acre

Cereals (barley and wheat)

Fall application (between September 1 and freeze up) to stubble or summerfallow for the control of green foxtail* in barley.

Products	Soil type					
	2 - 4% organic matter		4 - 6 % organic matter		6 - 10 % organic matter	
	Soil texture classes					
	Sandy to sandy loam	Loam to clay	Sandy to sandy loam	Loam to clay	Sandy to sandy loam	Loam to clay
Bonanza 10G	3.44 kg/acre	3.44 kg/acre	4.45 kg/acre	4.45 kg/acre	4.45 kg/acre	5.67 kg/acre
Rival 10 G		3.44 kg/acre		4.45 kg/acre	4.45 kg/acre	5.67 kg/acre

* Trifluralin (Bonanza/Rival) will not control trifluralin tolerant green foxtail.

Caution: For barley, do not apply Bonanza 10G, Rival 10G on Gray-Wooded soils or other soils containing less than 2% organic matter or on Black/Deep Black soils containing more than 6% organic matter.

Fall application (between September 1 and freeze up) to stubble or summerfallow for control of green foxtail* in wheat

Trifluralin (cont'd)

Products	All soils 2 - 8 % organic matter
Bonanza 10G or Rival 10G	2.23 kg/acre

* Trifluralin (Bonanza/Rival) will not control trifluralin tolerant green foxtail.

Caution: 2.23 kg/ac is the maximum rate for wheat. Do not use higher rates for wheat as crop injury may result.

Spring application in wheat and barley for control of millet (green foxtail) - Post-plant incorporated (harrowed in after seeding)

Products	Light textured soils	Medium textured soils	Heavy textured soils
Bonanza EC	0.49 L/acre	0.49 L/acre	0.70 L/acre
Rival EC		0.57 L/acre	0.65 L/acre
Treflan		0.49 L/acre	0.69 L/acre

Caution: Wheat or barley may be injured if seeded through a treated layer or into a deeply incorporated layer of trifluralin.

Tank Mixes

Fertilizers: Liquid products may be mixed with liquid nitrogen fertilizer (e.g., 28-0-0) for pre-plant soil incorporated application. Before the herbicide is added to the tank, compatibility of herbicide to the liquid fertilizer should be tested following instructions on herbicide label.

Trifluralin liquids may be blended with dry bulk fertilizer. Application should be made as soon as possible after blending. With the exception of ammonium nitrates, all other commonly used dry fertilizers may be used for trifluralin liquid impregnation.

Herbicides: Spring application - Post-plant incorporated (harrowed in after seeding)

Crop	Tank mixture	Soil texture	
		Light to medium	Heavy
Barley	Treflan or Bonanza or Rival + Avadex BW	Treflan or Bonanza or Rival EC: 0.49 L/acre Avadex BW: 1.70 L/acre	Treflan or Bonanza: 0.69 L/acre Rival EC: 0.65 L/acre Avadex BW: 1.70 L/acre
Wheat	Treflan or Bonanza or Rival EC + Avadex BW	Treflan or Bonanza or Rival EC: 0.49 L/acre Avadex BW: 1.40 L/acre	Treflan or Bonanza: 0.69 L/acre Rival EC: 0.65 L/acre Avadex BW: 1.40 L/acre

Incorporation

Summerfallow: Fall (Sept 1 - soil freeze up): Granular formulations must be incorporated at least twice with the implement operated in two different directions. The first incorporation should be in the same direction as application, within 24 hours of application. Second at the right angle to the first and should be delayed a minimum of 3 - 5 days. For best results, perform both incorporations in the fall followed by tillage (5 to 8 cm) in the spring prior to planting.

Summer (May to July): The initial incorporation must be done within 24 hours of application. The second incorporation (and subsequent incorporations) may be done whenever necessary to destroy resistant weed growth during the remainder of the summerfallow.

Fall applied liquids: All liquid formulations must be incorporated at least twice with the implement operated in two different directions. The initial incorporation must be done within 24 hours after application. The second incorporation (and subsequent incorporations) may be done whenever necessary to destroy resistant weed growth during the remainder of the fallow season. Shallow tillage (5 to 8 cm) is necessary in the spring prior to planting.

Fall applied granules in wheat and barley: Granules can be applied in the fall between September 1 and prior to soil freeze-up for the control of green foxtail in the following year. Granules should be applied to standing stubble or pre-worked stubble. The initial incorporation must be done within 24 hours of application. For best results, it is recommended to do both incorporations in the fall followed by tillage (5 to 8 cm) in the spring prior to planting.

Caution: Fall application is not recommended in situations where lack of trash cover combined with required incorporation would leave the soil exposed to erosion.

Spring granules (in year of seeding): Granular formulations: incorporate twice in cross directions using a tandem disc, tandem disc, discer or field (vibrashank type) cultivator set to work 8 to 10 cm for the first incorporation. The first incorporation should be done as soon as possible after application, but can be delayed up to 24 hours. The

Trifluralin (cont'd)

second incorporation can be delayed for at least 3 - 5 days following the first incorporation. This allows time for greater release of granular trifluralin onto soil particles and assures more uniform distribution in soil.

Spring liquid formulations in canola and specialty crops: (in year of seeding) must be incorporated at least twice with the implement operated in two different directions. The initial incorporation must be done within 24 hours after application. The second incorporation should be a discing or cultivation in a cross direction at the same depth any time prior to planting. Shallow tillage (5 to 8 cm) is necessary in the spring prior to planting.

Spring liquid formulations in wheat and barley: Liquid formulations must be applied after seeding and shallowly (2 - 4 cm), incorporated with tyne or diamond tooth harrows into trash-free soil, operating at a minimum speed of 9 km/hr. The first incorporation should be performed in the same direction of application. The second incorporation should be performed at the right angle to the first. Both incorporations should be done within 24 hrs of application.

Application Tips

Do not apply on soils that are wet, in poor tilth and contain 15% or more organic matter. Do not apply on soils with less than 2% organic matter. Application to severely eroded knolls is not recommended.

Do not apply to fields spread with manure during past 12 months. Do not apply to soils that are subjected to long-term flooding. Do not apply granular formulation on stubble in the fall for wheat when the crop harvested in the current calendar year was treated with trifluralin-based products. This includes applications made in the previous summer or fall. Seed into a firm, moist, weed-free seedbed using a double disc press drill or hoe drill set to seed 3 to 6 cm deep. If a discer or air seeder is used for seeding, separate spring tillage may not be necessary. However, care must be exercised such that the discer or air seeder is set to uniformly place the seed 3 to 6 cm deep and the seedbed should be firmly packed or harrowed after seeding to promote good germination. **Wheat:** Avoid deep seeding, loose seedbeds and seeding into cold soils. When seeding semi-dwarf wheat, special care should be taken to ensure shallow seeding. Apply only on trash-free or summerfallow fields. **Flax and Lentils:** Shallowly till and pack the soil in the spring to ensure a firm seedbed and accurate depth of seeding. Seed into well-packed and moist seedbed. Do not seed deeper than 4 cm.

How it Works

Kills weed seedlings as they germinate. Inhibits cell division in the actively growing points of roots and shoots.

Expected Results

Most weeds die before emerging. Weeds will exhibit swelling at the coleoptile region, stubby thick primary root development and lack of secondary roots, which leads to death due to inadequate moisture absorbing ability.

Restrictions

Rainfall: No effect once trifluralin is incorporated into the soil.

Cropping Restrictions: Oats, sugar beets and small-seeded grasses such as timothy, canaryseed grass and creeping red fescue should not be grown in rotation following a crop treated with trifluralin based products. Do not seed wheat as a rotational crop if trifluralin and/or ethalfluralin have been used at an oilseed/special crop/barley rate for two consecutive crops. Do not direct seed (zero till) a rotational crop into standing stubble on land that has been treated with trifluralin or ethalfluralin for the previous crop.

Grazing Restrictions: Do not graze the treated crop or cut for hay; there is not sufficient data to support such use.

Environmental Precautions

Direct contamination of any body of water with trifluralin may kill fish. Avoid contamination of water bodies. Trifluralin is considered non-toxic to bees because of the nature of the formulation. Trifluralin is considered very highly toxic to aquatic organisms on an acute basis, and essentially non-toxic to birds. Trifluralin is absorbed by the soil and is resistant to leaching. There is little lateral movement in soil.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) - technical 10,000 mg/kg body weight.

Storage

Granular formulations must be stored in a cool, dry location, out of sunlight. Do not store Rival EC below 5°C. Do not freeze Treflan EC and Bonanza EC formulations.

Triton C

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Triton C (PCP#28622)	E. I. duPont Canada	Thifensulfuron methyl :33.3% + tribenuron methyl: 16.7%	Wettable Soluble granules	1.47 kg 480 gms
		Quinclorac: 77%	Dry flowable	1.08 kg

40 acres per case

Crops and Staging

Crop	Staging
Feed barley (do not use on Belevedere or Lager varieties)	2 - 4 leaf stage
Wheat (spring and durum)	2 - 5 leaf stage

Weeds Controlled and Staging

Unless otherwise noted, apply to young and actively growing weeds from the cotyledon to 5 leaf stage.

annual sow thistle	flixweed	redroot pigweed	tartary buckwheat
ball mustard	green smartweed	round-leaved mallow	toadflax* (less than 15 cm tall)
Canada thistle*	hemp nettle	(2 - 6 leaf stage)	volunteer canola (excluding CLEARFIELD varieties)
chickweed	kochia**	Russian thistle	volunteer flax*
cleavers (1 - 4 whorls)	lady's-thumb	scentless chamomile*	volunteer sunflower
common groundsel	lamb's-quarters	shepherd's-purse	wild buckwheat (1-5 leaf)
corn spurry	narrow-leaved hawk's-beard	stinkweed	wild mustard
cow cockle	perennial sowthistle*	stork's-bill	

*Suppression

**Prairie-wide surveys of kochia fields have found approximately 90% of kochia populations are resistant to Group 2 herbicides. Without testing, assume kochia in your field is resistant and will not be controlled by this product alone.

Rate

Triton C: 39 g/acre

Tank Mixes

Tank mix partner	Tank mixture rate	Additional weeds controlled
Wheat (spring and durum), barley		
Puma Advance, Bengal, Cordon, WildCat	Triton C @ 39 g/acre + Puma Advance @ 412 mL/acre, Bengal, Cordon, WildCat @ 312 mL/acre	Green foxtail, barnyard grass and wild oats from 1 - 6 leaf stage.
Spring wheat and barley (excluding durum)		
Axial	Triton C @ 39 g/acre+ Axial @ 243 mL/acre + 283 mL/acre of adjuvant	Wild oats (1 - 6 leaf stage), volunteer oats, green foxtail (suppression), yellow foxtail, volunteer canaryseed, proso millet.
Axial + MCPA	Triton C @ 39 g/acre+ Axial @ 243 mL/acre + MCPA 600 283 mL/acre + 283 mL/acre of adjuvant	Wild oats (1 - 6 leaf stage), volunteer oats, green foxtail (suppression), yellow foxtail, volunteer canaryseed, proso millet, dandelion (up to 15 cm), CLEARFIELD canola.

Tank mix partner	Tank mixture rate	Additional weeds controlled
Spring wheat and durum		
Horizon NG, NextStepNG, Foothills, Signal	Triton C @ 39g/acre + Horizon NG/NextStep Ng @ 376 mL/acre (no adjuvant) or Foothills/Signal @ 95 mL/acre + 0.8% adjuvant v/v	Green foxtail (1 - 5 leaf), wild oats (1 - 6 leaf).
Harmony Grass	Triton C @ 39 g/acre + Harmony Grass @ 177mL/acre	Green foxtail(1 - 5 leaf), wild oats (1 - 6 leaf).
Spring wheat only		
Everest	Triton C @ 39 g/acre + Everest @ 8.7 - 17.4 g/acre + surfactant @ 0.25% v/v	Green foxtail, wild oats, volunteer oats.
Everest + 2,4-D Ester	Triton C @ 39 g/acre + Everest @ 8.7 - 17.4 g/acre + 2,4-D ester 700 @ 243 mL/acre + surfactant @ 0.25 v/v	Green foxtail, wild oats, volunteer oats + CLEARFIELD canola.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 22 L/ac (minimum).

Application Tips

Higher spray volumes needed with a dense crop canopy and/or large weeds. Weeds should be less than 10 cm tall or across at application. Triton C left in the tank for more than 24 hours might have reduced effectiveness. When crop is under stress, application may result in crop injury such as temporary crop colour lightening or a slight height reduction. Clean sprayer immediately after application and use ammonia to deactivate Triton C.

How it Works

Absorbed through foliage. Inhibits cell elongation. Causes stem elongation, leaf cupping or curling.

Expected Results

Growth stops immediately. Discolouration of dying weeds may not be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under drought stress.

Restrictions

Rainfall: Rainfall within 6 hours of application may reduce weed control.

Grazing: May not be grazed or fed to livestock within 77 days of application on wheat, 80 days on barley.

Pre-harvest Intervals: Allow 77 days between application and harvest on wheat, 80 days on barley.

Re-cropping: Wheat (spring and durum) and barley have no re-cropping interval. Canola, flax, field pea, lentil and sunflower can be seeded 10 months after application. Oats can be seeded 12 months after application. Under dry conditions and light soils, the re-cropping interval for flax and lentil should be 12 months.

Environmental Precautions

Triton C is toxic to aquatic organisms and non-target terrestrial plants. Leave a 1 metre buffer around water bodies and 15 meters between applied area and sensitive terrestrial habitats. Do not use soils that have large coarse textured areas, eroded knolls, or calcium deposits.

Runoff: Avoid runoff by using recommended buffer zones.

Toxicity

Triton C is a combination package of 2 products: Refine SG and quinclorac: Refine SG: Low oral toxicity. Oral LD₅₀ (rat) = > 5,000 mg/kg. Quinclorac: Moderate oral toxicity. Acute oral LD₅₀ (rat) = > 2,200 mg/kg.

Storage

Store in a cool, dry place. Does not freeze. Bring to room temperature prior to use.

Triton K



Caution Poison

Group 2, 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
DB 858 (PCP # 28872)	E. I. duPont Canada	Tribenuron Methyl 8.25% + Dicamba: 58.45%	Wettable granules	1.47 kg
2,4-D LV ester 700 (PCP # 23192)		2,4-D LV ester:	Emulsifiable concentrate	9.61 L jug

Crops and Staging

Crop	Staging
Barley*	Apply from the 3 leaf (fully expanded) to the 6 leaf plus 3 tillers.
Spring wheat excluding durum*	

*Do not apply to wheat and barley underseeded to legumes.

Weeds Controlled and Staging

Unless otherwise noted, apply to young and actively growing weeds that are less than 10 cm tall or across and before canopy closes.

annual sunflower	dandelions* up to 15 cm in diameter	narrow-leaved hawk's-beard*	sweet clover
ball mustard	false ragweed	plantain (common)	thyme-leaved spurge
bluebur	flixweed*	prickly lettuce	tumble mustard
burdock	giant ragweed	redroot pigweed	volunteer canola
Canada thistle (top growth control)	hare's-ear mustard	Russian pigweed	wild buckwheat (1 - 4 leaf)
cocklebur	Indian mustard	Russian thistle	wild mustard
cow cockle	kochia (2 - 10 leaf)	shepherd's-purse*	wild radish
daisy fleabane	lamb's-quarters	stinging nettle	wormseed mustard

* Fall rosettes and spring seedlings

Rate

Triton K: 37 g/acre + 2,4-D LV 700: 243 mL/acre

Tank Mixes

Tank mix partner	Tank mixture rate	Additional weeds controlled
Spring wheat (excluding durum)		
Everest	Triton K @ 37 g/acre + 2,4-D LV 700 ester @ 243 mL/acre + Everest @ 8.7 - 17.4 grams/acre	Green foxtail, wild oats, volunteer oats.
Puma Super ¹²⁰	Triton K @ 37 g/acre + 2,4-D LV 700 ester @ 243 mL/acre + Puma Super ¹²⁰ @ 156 mL/acre	Green foxtail and wild oats.

Application Information

With: Ground equipment only. Do not apply by air.

Water volume: 22 L/ac (minimum).

Application Tips

Apply when air temperature is between 10 and 25°C. Do not apply when there is a risk of severe drop in night temperature. Application to stressed crops may result in crop injury. Drought, disease or insect damage following

Triton K (cont'd)

application may also result in crop injury. Under certain conditions, temporary crop colour lightening and occasionally, a slight reduction in crop height may occur. Effectiveness of Triton may be reduced if it remains in the tank for more than 24 hours.

How it Works

Absorbed through foliage. Inhibits cell elongation. Causes stem elongation, leaf cupping or curling.

Expected Results

Growth stops immediately. Discolouration of dying weeds may not be noticeable for 1 - 3 weeks after application, depending on growing conditions and weed species. Poor results may be expected if there is improper mixing, timing, coverage or when weeds are under drought stress.

Restrictions

Rainfall: Requires 4 - 6 hours to be absorbed, longer under cool, damp conditions.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application.

Pre-harvest Intervals: Allow at least 30 days between application and harvest.

Environmental Precautions

Triton K is toxic to aquatic organisms and non-target terrestrial plants. Leave a 1 - 4 metre buffer between treated area and sensitive wildlife and aquatic areas. Do not use on highly variable soils with coarse soils, eroded knolls, or calcium deposits.

Runoff: Avoid runoff by using the recommended buffer zones.

Toxicity

Triton K is a combination package of 2 products: Refine SG and Dicamba: Refine SG: Low oral toxicity. Oral LD₅₀ (rat) = > 5,000 mg/kg. Dicamba: Moderate oral toxicity. Acute oral LD₅₀ (rat) = > 2,060 mg/kg.

Storage

Store in a cool, dry place. Do not freeze. If freezing occurs, bring to room temperature and mix thoroughly.



Danger Poison

Trophy

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Trophy A (PCP # 27246)	Nufarm Agriculture	Fluroxypyr: 180 g/L	Emulsifiable concentrate	4.8 L
Trophy B (PCP # 27245)		MCPA ester 500		9.0L
Trophy 600 A		Fluroxypyr: 180 g/L		4.8 L
Trophy 600 B		MCPA Ester 600		7.5 L

Crops and Staging

Crop	Staging
Barley	Apply from the 3 leaf up to the flag leaf (fully expanded).
Spring wheat (including durum)	
Canary seed	

Trophy (cont'd)**Weeds Controlled and Staging**

Unless otherwise noted, apply at 2 - 4 leaf stage.

annual sunflower	hempsnettle (2 - 6 leaf)	redroot pigweed (1-4 leaf)	volunteer flax (1-12 cm)
burdock	kochia (including Group 2	shepherd's-purse	wild buckwheat* (1-4 leaf)
cleavers (1-4 whorl)	resistant biotypes)	stinkweed	wild mustard
cocklebur	lamb's-quarters	stork's-bill* (1-8 leaf)	wild radish
flixweed	prickly lettuce	vetch	
green smartweed*	ragweed	volunteer canola	

* Suppression only

Rate

Trophy A: 240 mL/acre	Trophy 600 A: 240 mL/acre
Trophy B: 450 mL/acre	Trophy 600 B: 372 mL/acre

One case of Trophy treats 20 acres

One case of Trophy 600 treats 20 acres

Tank Mixes

Tank mix partner	Tank mixture rate	Additional weed controlled
Spring wheat (including durum) and feed barley only		
Achieve Liquid + Turbocharge	Trophy A @ 240 mL/acre + Trophy B* @ 450 mL/acre + Achieve liquid @ 200 mL/acre + Turbocharge @ 0.5% v/v	Wild oats and green foxtail.
Assert + pH adjuster	Trophy A @ 240 mL/acre + Trophy B* @ 450 mL/acre + Assert @ 526 - 648 mL/acre	Wild oats: 1- 3 leaf stage: 526 mL/acre. Wild oats: 1- 4 leaf stage: 648 mL/acre.
Puma Advance, WildCat, Bengal, Cordon	Trophy A @ 240 mL/acre + Trophy B* @ 450 mL/acre + Puma Advance @ 412 mL/acre or WildCat, Bengal, Cordon @ 312 mL/acre	Wild oats.
Spring wheat (excluding durum)		
Horizon NG, NextStep NG, (no adjuvant, Foothills/Signal/Ladder/Legend + adjuvant)	Trophy A @ 240 mL/acre + Trophy B* @ 450 mL/acre + Horizon NG/NextStep NG @ 376 mL/acre or Foothills/Signal/Ladder @ 93 mL/acre + adjuvant.	Wild oats and green foxtail.

* For Trophy 600 B rate is 372 mL/acre. Respective labels for Trophy and Trophy 600 detail appropriate mixing procedures.

Application Information

With: Apply with ground equipment only. Do not apply by air.

Water volume: 40 L/ac.

Application Tips

Spray under optimal conditions, which includes temperatures ranging from 12°C to 24°C. Reduced activity will occur with temperatures below 8°C or above 27°C. Frost shortly before application or shortly after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions. Wet foliage at time of application may result in reduced weed control. Application on cleavers can be made up to 6 whorl (20 cm height) stage. Do not apply to wheat and barley underseeded to legumes. Make only one application per year. Application prior to 3 leaf stage of wheat and barley may cause severe twisting of leaves and leaf stem and head deformities, which may reduce yield. Do not apply later than flag leaf stage of crop.

How it Works

Trophy herbicide tank mix is non-residual. The components of Trophy tank mix move within the plant to control exposed and underground plant tissue. It mimics naturally occurring plant hormones and controls weeds by disrupting normal plant growth patterns. Symptoms include twisting of stems and swollen nodes.

Expected Results

Weeds start to twist shortly after spraying. After twisting and bending, plants stop growing, turn brown and die.

Trophy (cont'd)

Restrictions

Rainfall: Do not apply if rain is expected in 1 hour.

Grazing: Do not permit any grazing or cut for hay within 7 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Do not harvest the treated crop within 60 days after application.

Re-cropping: Fields previously treated with Trophy herbicide tank mix can be seeded the following year to wheat, barley, oats, rye forage grasses, flax, lentils, peas, canola and mustard, or summerfallow. Do not seed crops other than those listed above for at least one year following treatment.

Environmental Precautions

Trophy is moderately to highly toxic to aquatic organisms.

Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning of equipment.

Drift: Avoid contamination of sensitive aquatic and terrestrial areas with a 15 metre buffer zone from the treated area.

Toxicity

MCPA has moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical 700 - 880 mg/kg. Fluroxypyr has very low mammalian toxicity. Acute oral LD₅₀ = > 2,000 mg/kg.

Storage

Store in a dry, heated area. If product is frozen, bring to room temperature and agitate before use.

Tropotox Plus/Clovitox Plus/ Topside



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Clovitox Plus (PCP # 264886)	IPCO	MCPB (Na-salt): 375 g/L + MCPA (K-salt): 25 g/L	Solution	10 L jug
Tropotox Plus (PCP # 8211)	Nufarm Agriculture			
Topside (PCP # 22003)	United Agri Products			

Crop and Staging

Crop	Stage
Cereals: barley, oats, rye, wheat	Apply from 2 leaf stage to flag leaf stage.
Field Pea	Apply when peas have 3 to 6 expanded leaves.
Field corn	After the crop is 45 cm high, but before the beginning of tasselling. Drop nozzles should be used.
Pasture	After grazing or cutting, when weeds are at a susceptible stage.
Seedling alfalfa	Apply at 3 - 6 trifoliate stage.
Seedling clover: wild white, dutch white, Ladino, alsike and red clovers	Apply after primary or spade leaf stage to fourth-true-leaf stage. Companion crop: wheat, oats, barley.

Tropotox Plus/Clovitox Plus/Topside (cont'd)

Crop	Stage
Seedling grasses: seedling smooth brome grass, meadow brome grass, alai fescue, creeping red fescue, meadow fescue, tall fescue, alai wild ryegrass, Russian wild ryegrass, timothy, crested wheatgrass, intermediate wheatgrass, pubescent wheatgrass, tall wheatgrass, slender wheatgrass, streambank wheatgrass, northern wheatgrass, western wheatgrass, green needlegrass, reed canary grass	Apply at the 2 - 4 leaf stage of crop.

Weeds Controlled, Rate and Staging**Weeds controlled in seedling stage at 1.11 L/acre.**

ball mustard	stinkweed	wormseed mustard
lamb's-quarters	wild mustard	

Weeds controlled at 1.72 L/acre in seedling stage unless otherwise noted.

annual sow thistle*	Canada thistle (15 cm to early bud)	field horsetail (15 cm tall)**	ragweed
bull thistle (rosette to early bud)	curled dock (rosette)	hemp nettle*	redroot pigweed
buttercup (tall and creeping when rapidly growing**	field bindweed (spring-rapid growth)**	perennial sow thistle (rosette)**	shepherd's-purse
		plantain (rosette)	volunteer canola
			wild radish*

* Suppression only

** Top growth control only

Application Information**With:** Apply with ground sprayers only. Do not apply by air.**Water volume:** 60 - 80 L/ac.**Application Tips**

Spray in warm weather when plants are actively growing. Peas: Spray when growing conditions are good and the peas are not under stress from drought or disease. Seedling alfalfa: Alfalfa vigour may be reduced in the year of treatment; however, the crop recovers and yield will not be affected.

How it Works

A systemic, absorbed by leaves and stems and translocated to actively growing regions. It disrupts cell division, stops cell growth and interferes with respiration and food reserves. Selectivity based on ability of plant to efficiently convert MCPB to MCPA.

Expected Results

Broadleaf weeds should be dead within 2 - 3 weeks of treatment. Poor results and/or crop injury may be expected if Water volume is incorrect or weeds are too mature.

Restrictions**Rainfall:** Rainfall before the foliage has dried from the spraying may decrease activity.**Grazing:** Do not graze the treated crop or cut for forage until 30 days after treatment. Do not graze the seedling grasses or cut for hay in the year of establishment. Withdraw meat animals from treated fields at least 3 days prior to slaughter.**Re-cropping:** None.**Environmental Precautions**

Toxic to aquatic organisms and non-target terrestrial plants.

Runoff: Avoid contamination of aquatic areas as a result of runoff by using the recommended buffers between treated ground and sensitive areas.**Leaching:** This chemical may result in contamination of groundwater through leaching, particularly in coarse textured soils or areas where the water table is shallow.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = 500 mg/kg. Non-toxic to bees. Intake can cause convulsions and coma. Can cause burns to the skin and eyes.

Storage

Store in a heated area.

Tundra

Group 1, 6, 27

Formulations

Product	Company	Active ingredient	Formulation	Container size
Tundra (PCP# 29367)	Bayer CropScience	Pyrasulfotole 15.5 g/L	Emulsifiable concentrate	8.9 L, 129.6 L
		Fenoxaprop-p-ethyl: 46 g/L	Emulsifiable concentrate	
		Bromoxynil 87.5 g/L	Emulsifiable concentrate	

8.9 L case will do 40 acres

Crops and Staging

Crops	Staging
Barley, spring wheat (including durum)	1 - 6 leaf on main stem plus 3 tillers

Weeds Controlled and Staging

Apply at 1 - 6 leaf stage unless otherwise noted.

annual sow thistle	dandelion (suppression only-up to 10 cm high)	pale smartweed	stinkweed
barnyard grass	flixweed, (up to 10 cm high)	perennial sowthistle (suppression)	Russian thistle
Canada thistle (suppression-up to 30 cm high)	green foxtail	redroot pigweed	volunteer canola (all types)
chickweed	hemp-nettle	round-leaved mallow (suppression)	wild buckwheat
cleavers (1 - 6 whorl)*	kochia, (up to 10 cm high)	shepherd's purse	wild mustard
common ragweed	lamb's quarters		wild oats
*in the 4 - 6 whorl stage, add ammonium sulphate at 202 gm/ac (99% soln.) or 404 mL/ac (49% soln.)			
			yellow foxtail

Rate

809 mL/ac

Tank Mixes

None.

Application Information

How to Apply: Ground and air. Apply only once per season.

Water volume: 19 L/ac ground, 11.3L/ac air.

Application Tips

Use higher water volumes under conditions of heavy crop or weed canopies. For best results apply to young, actively growing weeds. Under cool, dry conditions, activity may be reduced or delayed. Activity may be affected if weeds are dust covered or covered in heavy dew, mist or rain. Do not apply to a stressed crop but apply after plants resume normal growth.

How it Works

Tundra is composed of 3 herbicides active ingredients, fenoxaprop-p-ethyl, bromoxynil and pyrasulfotole. Fenoxaprop-p-ethyl works by contact and systemically. It moves to the roots and shoots and kills the growing point.

Tundra (cont'd)

Pyrasulfatole is also systemic, inhibiting plant pigment formation and photosynthesis. Bromoxynil is a contact herbicide, inhibiting respiration and photosynthesis.

Expected Results: Typical symptoms include broadleaf weeds turning brown and dying within 3 - 5 days, reduced grassy leaf growth and chlorotic blotching within 3 days of application followed by leaf chlorosis and complete death by 2 - 3 weeks and leaf bleaching.

Restrictions

Rainfall: Rainfall within 1 hour of application may reduce effectiveness.

Grazing: Do not graze or cut the treated crop for hay within 25 days of application.

Pre-harvest Interval: Leave at least 65 days from application to harvest.

Re-cropping: The following crops can be grown 10 months after application: alfalfa, barley, canaryseed, canola, flax, field peas*, oats and wheat (spring and durum). Lentils can be grown 22 months after application. Use a field bioassay for crops not listed above. *Field peas may be grown the year following Tundra herbicide application in all Black, Gray-Wooded and Dark Brown soil zones. DO NOT plant field peas the year following an Infinity herbicide application in the Brown soil zone where organic matter content is below 2.5 % and where soil pH is above 7.5.

Environmental Precautions

Tundra is toxic to aquatic organisms and non-target terrestrial plants. Leave at least a 15 metre buffer zone around sensitive terrestrial and aquatic habitats. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment.

Toxicity

Toxic to aquatic organisms and sensitive terrestrial plants. Use of a hand-held backpack sprayer, inter-row hooded sprayer, spot treatment, soil drench and soil incorporation require no buffer zones. Otherwise, use recommended buffer zones of 3 - 10 metres when using ground application, 1 - 375 metres by air.

Storage

Store in a heated shed. Do not freeze.

UpBeet



Caution Poison

Group 2

Formulations

Product	Company	Active ingredient	Formulation	Container size
UpBeet (PCP # 25813)	E.I. duPont Canada	Triflurosulfuron methyl: 50%	Dry flowable	117 grams

Crops and Staging

Crops	Staging
Sugar beet	Apply any time after planting and after weeds have emerged.

Weeds Controlled and Staging

UpBeet + Non-ionic surfactant: Velvetleaf

Rate

UpBeet: 14 - 28 g/acre

Surfactant (Agsurf, Agral 90, Citowett Plus): 0.25 % v/v

Tank Mixes

Apply when weeds are in cotyledons to 4 leaf stage, approximately 5 cm tall or across.

Tank mix partner	Tank mixture rate	Additional weeds controlled
Betamix*	UpBeet @ 14 - 28 g/acre + Betamix @ 0.7 - 1.4 L/acre. Note: Do not add surfactant to this tank mixture.	Green foxtail (suppression), kochia (rosette stage < 2.5 cm in diameter), redroot pigweed, lamb's-quarters

* Make two sequential applications. The total grams of product applied must not exceed 40 g/ac per growing season.

Application Information

How to Apply: Ground equipment only. Do not apply by air. Do not apply through any type of irrigation equipment.

Water volume: Minimum of 40 L/ac.

Application Tips

Applications should be made 5 - 10 days apart or as weeds germinate. Weeds should be actively growing and not under stress. For best results, apply to small, emerged weeds between the cotyledon and 4 true leaf stage at approximately 5 cm tall or across. Applications made to larger weeds or to weeds under stress may result in unsatisfactory control. Since UpBeet has little or no soil activity, only weeds that have emerged above the soil surface will be controlled. Use sequential tank mix applications to control new weed flushes. Timely cultivation(s) can be used in addition to UpBeet tank mixes for optimum weed control in a sugar beet management program. Dry, dusty field conditions may reduce weed control in wheel track areas. Higher water volumes may improve control in these conditions.

How it Works

Absorbed through foliage. Inhibits cell elongation.

Expected Results

UpBeet herbicide rapidly stops the growth of susceptible weeds; weeds turn yellow usually 7 - 21 days after post-emergent application, followed by the death of the growing plant. Cool and/or dry conditions may reduce or delay herbicidal activity. Large weeds or weeds stressed due to frost, drought or water-saturated soil, disease or insect damage may not be controlled adequately.

Restrictions

Rainfall: Rainfall within 6 hours may reduce weed control.

Grazing: No restrictions on grazing or feeding of crop residue to livestock.

Pre-harvest Intervals: Do not apply within 60 days of harvest.

Cropping Restrictions: Do not harvest within 60 days of treatment.

In case of crop failure, only sugar beets may be replanted 30 days after application of UpBeet. However, if a total of 100 g/ha of UpBeet has already been applied to the first crop of sugar beets, then no more UpBeet may be applied to the second crop of sugar beets. Cereal crops (spring wheat, durum wheat, winter wheat, barley) may be planted the following year after application of UpBeet. For all other crops, a field bioassay must be conducted.

Environmental Precautions

Do not contaminate water bodies by applying directly to water, or to areas where surface water is present, or through wash water.

Toxicity

Very low toxicity by ingestion. Acute oral LD_{50} (rats) = > 5,000 mg/kg. Low toxicity by inhalation.

Vanquish/VMD 480



Caution Poison

Group 4

Formulations

Product	Company	Active ingredient	Formulation	Container size
Vanquish (PCP # 26980)	Syngenta	Dicamba: 480 g/L	Liquid	10 L jug
VMD 480 (PCP# 29251)	Adjuvants Plus Inc.	Dicamba:480	Liquid	10 L

Crops and Staging

Non-crop areas such as established turf, roadsides, hydropower lines, pipeline and railway rights-of-way, airports, military bases and wasteland.

Weeds Controlled, Rates and Staging

Broadleaf weeds: When actively growing, normally between May and July.

Brush control: When leaves are fully expanded (spring, early summer) and stop applications at least 3 weeks prior to a change of leaf colour in the fall.

Vanquish/VMD 480 at 0.5 L/acre (top growth control only)

absinthe	leafy spurge	poverty weed	scentless chamomile
Canada thistle	perennial sow-thistle		

Vanquish/VMD 480 at 0.7 L/acre + 2,4-D amine 500 @ 0.9 L/acre: Above weeds plus poison ivy

Vanquish/VMD 480 at 0.85 L/acre + 2,4-D amine 500 @ 1.8 L/acre: All of the above weeds plus wild carrot

Vanquish/VMD 480 at 0.93 L/acre

Canada thistle	English daisy	giant ragweed	perennial sow thistle
common ragweed	false ragweed	goldenrod	tansy ragwort
curled dock (top growth)	field bindweed		

Vanquish/VMD 480 at 1.90 L/acre

diffuse knapweed	ground cherry	poverty weed	thyme-leaved spurge
goat's-beard	pasture sage	sheep sorrel	

Vanquish/VMD 480 at 3.7 L/acre Controls:

baby's breath	lambkill	Russian knapweed (top growth control)	velvet grass
bracken fern (top growth)	perennial cinquefoil (top growth control)		
fringed sage brush			

Brush control chemical amounts mixed in 1000 L of solution

Vanquish/VMD 480 @ 2.1 L/acre + 2,4-D amine 500 @ 4.0 L or 2,4-D ester 600 @ 3.3 L

alder	cherry	wild rose	wolf willow
aspen poplar	western snowberry		

Vanquish/VMD 480 @ 4.0 L/acre + 2,4-D amine 500 @ 8.0 L or 2,4-D ester 600 @ 6.6 L

balsam fir	black cottonwood	hickory	spruce
balsam poplar	bur oak	pine	tamarack
birch	elm	red oak	vine maple and white cedar

Vanquish/VMD 480 @ 5.2 L/acre + 2,4-D + dichlorprop @ 7.1 L

sugar maple	white ash
-------------	-----------

Vanquish/VMD 480 for Turf @ 202 mL/acre in 45 L/ac water

clover	erect knotweed	mouse-eared chickweed	sheep sorrel
--------	----------------	-----------------------	--------------

Roadside Vegetation Control

Vanquish/VMD 480 can be used in a tank mix with glyphosate (356 g/L formulation) for annual vegetation control on 1 - 2 metre wide roadside shoulders. Vanquish tank mixes with glyphosate and 2,4-D offer a broader spectrum of total control of roadside vegetation. Apply to actively growing weeds between May and July at following rates:

Vanquish/VMD 480 @ 0.5 - 1.0 L/acre + glyphosate (356 g/L formulation) @ 0.3 - 0.4 L/acre or Vanquish/VMD 480 @ 121 mL L/acre + 2,4-D amine 500 @ 485 mL/acre + glyphosate (356 g/L formulation) @ 0.3 - 0.4 L/acre.

Application Information

How to Apply: Apply with ground equipment or by air.

Water volume: Ground: Turf weeds: 45 L/ac; Weeds: 45 - 90 L/ac; Brush: rate/1,000 L of water. Aircraft: 35 L/ac minimum.

Application Tips

Thorough coverage of weed and wetting brush to the point of runoff are essential for control. Brush and trees over 2 metres should be cut and regrowth sprayed. Do not use on bentgrass. Do not rake, mow or water turf within 24 hours after treatment. 2,4-D ester tank mix may improve brush control, especially under drought stress. Tank mix with 2,4-D (amine or ester) for control of a broader range of weeds. Avoid spraying if temperatures exceed 30°C, to reduce risk of vapour drift. Avoid spraying onto soil over root system of desirable trees and shrubs. Thoroughly clean application equipment after use.

How it Works

Dicamba is a systemic herbicide absorbed through roots or leaves and translocated in most plants. Disrupts the metabolic and growth activities in the plant.

Expected Results

Excellent control of brush can be expected within a year of application. Effect on broadleaf weeds may be seen in 10 - 14 days with twisting and bending of main stem, cupping of leaves, increase in root size and increase in fibrous roots.

Restrictions

Rainfall: Rainfall 4 hours after application will not reduce effectiveness.

Grazing: Do not permit lactating dairy animals to graze fields within 7 days after application. Do not harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Environmental Precautions

Vanquish is toxic to aquatic organisms and non-target terrestrial plants. Do not apply directly to water or in areas it can wash into water bodies.

Runoff: Avoid runoff from treated areas into sensitive aquatic and terrestrial habitats.

Leaching: The use of Vanquish chemical may result in contamination of groundwater, as it will leach in coarse textured soils.

Toxicity

Slightly toxic by ingestion. Acute oral LD_{50} (rats) = > 3,512 mg/kg. Slightly toxic by contact.

Storage

Freezing may cause crystalization but no activity is lost if completely resuspended.

Velocity m3/Velocity m3 All-In-One



Caution Poison

Group 2, 6, 27

Formulations

Velocity m3 co-package contains:

Product	Company	Active ingredient	Formulation	Container size
Velocity A (PCP#29213)	Bayer CropScience	Thiencarbazone-methyl: 10 g/L	Suspension	4 L jug
Velocity B (PCP# 29214)		Pyrasulfotole: 37.5 g/L + Bromoxynil: 210 g/L	Emulsifiable concentrate	6.7 L jug
Velocity m3 All-In-One (PCP#29584)	Bayer CropScience	Thiencarbazone-methyl: 5 g/L Pyrasulfotole: 31.3 g/L Bromoxynil: 175 g/L	Suspension	8.1 L jug

One jug of Velocity m3 All-In-One will treat 40 acres

Crop, Timing and Rate

Crop	Timing	Rate
Spring and durum wheat	1 - 6 leaves on main stem, plus 3 tillers.	Velocity A: 0.2 L/acre + Velocity B: 0.335 L/acre or Velocity All-In-One: 0.4L/acre

Weeds Controlled and Timing

For best results, apply to emerged, young, actively growing weeds according to the weed stages listed. Under stressed conditions and/or heavy crop canopy, early application will result in improved weed control.

Grassy Weeds: Apply 1 to 6 leaves, up to emergence of the 3rd tiller

barnyard grass	green foxtail
canary seed (1 - 6 leaf, up to emergence of 2nd tiller)	Japanese brome* (1 - 6 leaf)
	persian dandel*

yellow foxtail*
wild oats

Broadleaf Weeds: Unless otherwise stated, apply at 1 - 6 leaf stage

annual sow-thistle	hemp-nettle
Canada thistle* (up to 30 cm in height)	kochia (up to 10 cm in height)
chickweed	lamb's-quarters
cleavers	pale smartweed
common ragweed	perennial sow-thistle*
dandelions ¹ (up to 10 cm in height and 25 cm in diameter)	redroot pigweed
flixweed	round-leaved mallow
	Russian thistle

shepherd's-purse
stinkweed
volunteer canola (all types)
wild buckwheat
wild mustard

* Suppression only.

¹ Includes seedlings and overwintered rosettes.

Rate

Velocity A: 200 mL/acre + Velocity B: 335 mL/ac.

Velocity m3 All-In-One: 0.4 L/ac.

Application Information

How to Apply: Apply with ground equipment or by air.

Water volume: Ground: minimum of 18.9 L/ac. Air: minimum of 11.3 L/ac.

Application Tips

Do not apply to crops underseeded to legumes. Do not use Velocity m3 if another Group 2 grass herbicide has been previously applied in the same season. For best results, apply to emerged, young, actively growing weeds. Weed control may also be reduced if application is made when weeds are dust covered or in the presence of heavy dew, fog or mist/rain. Do not apply to crop that is under stress due to abnormal environmental conditions such as frost, extreme heat, low fertility, drought, flooding or disease and/or insect damage as crop injury may result.

How it Works:

Velocity A: Thienencarbazone-methyl: Uptake is primarily via foliage and is transported to areas on new shoot growth where it inhibits the enzyme acetolactate synthase (ALS). Inhibition of this enzyme prevents protein production, which leads to gradual death of target weeds.

Velocity B: Pyrasulfotole: Absorbed through leaves and is translocated to meristematic regions where it inhibits the HPPD enzyme. Pyrasulfotole inhibits plant pigment biosynthesis and photosynthesis. Bromoxynil: Works on contact, interfering with photosynthesis, disrupting plant growth, which ultimately leads to the plant's death.

Expected Results

Grass weeds: Growth of susceptible plants stops rapidly, and after a few days plants, develop chlorotic discolouration on the leaves, which sometimes turn red. Complete control may take two to four weeks.

Broadleaf weeds: Small burnt spots on leaf can appear in hours. Lack of plant pigments shuts down the photosynthetic pathway resulting in bleaching symptoms and rapid death, normally in 6 - 14 days.

Restrictions

Rainfall: Rainfall within 60 minutes of application may reduce effectiveness.

Grazing restrictions: Do not graze the treated crop or cut for forage or hay within 25 days after application.

Pre-harvest Intervals: Do not harvest wheat for grain or straw within 60 days of application.

Re-cropping: The following crops can be planted 10 months after application: alfalfa, barley, corn, canary seed, canola, flax (including low linolenic acid varieties), field peas*, oats, spring and durum wheat, soybeans. The following crops can be planted 22 months after application: lentils.

*Field peas may be grown the year following Velocity m3 application in all Black, Gray Wooded and Dark Brown soil zones. DO NOT plant field peas the year following a Velocity m3 application in the Brown soil zone where organic matter content is below 2.5 % and where soil pH is above 7.5.

Environmental Precautions

This product is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones of 1 - 5 metres with ground application. Do not allow into surface water, drains and groundwater.

Toxicity

Moderately toxic by ingestion. Acute oral LD₅₀ (rats) = > 2,000 mg/kg. Slightly toxic by contact. Moderate skin and eye irritation.

Storage

Store in a cool, dry place. Do not store below freezing.

Velpar L/Velpar DF

Group 5

Formulations

Product	Company	Active ingredient	Formulation	Container size
Velpar L (PCP# 18197)	BASF Canada	Hexazinone: 240g/L	Solution	10 L jug
Velpar DF (PCP# 25225)		Hexazinone: 75%	Water dispersible granule	2 kg bag

Velpar L/Velpar DF (cont'd)**Crop and Timing**

Alfalfa - Velpar L: Apply at 0.85 - 1.7 L/ac, Velpar DF: 272 - 544 g/ac

Crop - Velpar L	Timing
Established, grown for seed alfalfa Coniferous forest, non-crop areas for vegetation control	Apply in late fall or early spring when alfalfa is dormant. It must be seed alfalfa established for at least 18 months.

Weeds Controlled and Staging**In alfalfa**

dandelion

narrow-leaved hawk'sbeard

quackgrass

scentless chamomile

sow thistle

Check label for weeds controlled by Velpar in non-crop areas.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: 81 L/ac.

Application Tips

Do not apply to frozen soils or soils with less than 1% soil organic matter.. Do not use on fields that will be seeded to other crops within 24 months of application. Persistence of Velpar L herbicide in the soil is influenced by temperature, rainfall, soil type and organic matter. Do not apply to slopes as soil erosion may occur.

How it Works

A systemic herbicide readily absorbed through the roots and foliage and translocated upwards. Inhibits photosynthesis.

Restrictions

Rainfall: Rainfall less than 4 hours after application may affect the contact activity.

Grazing: Do not graze the treated crop or cut for hay; there are not sufficient data available to support such use.

Re-cropping: Information enabling specific recommendations for rotational crops and re-cropping intervals is limited. Do not seed any crop following alfalfa that has been treated with Velpar L herbicide until a successful field bioassay shows that the crop in question may be grown safely. A successful field bioassay means growing to maturity a test strip of the crop across the field.

Environmental Precautions

Apply with a 1 metre buffer between aquatic habitats and a 5 metre buffer between sensitive terrestrial habitats and the treated area.

Runoff: Prevent contamination of aquatic and sensitive terrestrial areas through using the recommended buffer zones. Coarse textured soils are more susceptible to leaching.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical 1,690 mg/kg. May cause some eye irritation. Slightly toxic to fish.

Storage

Store in a cool, dry place. Keep away from heat, sparks and open flame.

Viper

Group 2, 6

Herbicides

Formulations

Viper is a prepackaged tank mix containing:

Product	Company	Active ingredient	Formulation	Container size
Solo (PCB # 25496)	BASF Canada	Imazamox: 70%	Water dispersible granules	4 x 117 grams
Basagran Forte (PCP # 22006)		Bentazon: 480 g/L	Solution	2 x 7.23
UAN (28-0-0)*		UAN: 28%	Liquid	2 x 8 L

*BASF 28% UAN is required and sold separately.

Crop and Timing

Crop	Timing
Field peas	3 - 6 above ground nodes. Note: Temporary crop yellowing may be observed shortly after application.

Weeds Controlled and Staging

Grassy weeds: 1 to 4 main leaves or until early tillering.

barnyard grass	volunteer barley	wild oats
green foxtail	volunteer canaryseed	yellow foxtail
Japanese brome*	volunteer tame oats	
Persian dandel	volunteer wheat (excluding CLEARFIELD wheat)	

Broadleaf weeds: Cotyledons to 4 leaf stage.

cleavers*	lamb's-quarters	wild buckwheat*
cow cockle	redroot pigweed	wild mustard (including Group 2
green smartweed	shepherd's-purse	resistant biotypes)
kochia* (including Group 2 resistant	stinkweed	
biotypes)	volunteer canola (all types)	

* Suppression only.

Rate

Solo: 11.7 g/ac.

Basagran Forte: 0.36 L/ac.

BASF 28 % UAN: 0.81 L/ac. BASF 28% UAN (sold separately) must be used with Viper at 0.81 L/ac. Note: Merge adjuvant is not required for use with Viper.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: 40 L/ac.

Application Tips

Water soluble bags will dissolve better when kept intact; do not split bags. If agitation is stopped for more than 5 minutes, re-suspend spray solution by full agitation prior to commencing spraying again. Do not spray Viper if temperatures of +5°C or lower are forecasted within 3 days of application. Cold temperatures near freezing will negatively affect herbicide performance, as weeds are not actively growing. Initial transient crop yellowing may be observed after application, but this is outgrown and should not affect yield. Apply Viper when broadleaf weeds are small and actively growing and before weeds reach the maximum size recommended for control.

Failure to include UAN will result in significantly reduced product performance.

Viper (cont'd)**How it Works**

Imazamox is a systemic herbicide absorbed by foliage and roots that disrupts plant metabolism causing growth to stop. Bentazon is a contact herbicide taken up primarily through the leaves and interferes with photosynthesis. Thorough coverage of foliage is important for consistent weed control.

Restrictions

Rainfall: Rainfall within 6 hours of application may reduce activity.

Grazing: Do not graze treated field peas or cut for feed within 20 days of application.

Pre-harvest Interval: Do not apply within 60 days of harvest.

Re-cropping: Canary seed, CLEARFIELD canola, non-CLEARFIELD canola, chickpea, field corn, field pea, flax, lentil, oat, barley and spring wheat (including durum), tame oats and sunflowers may be seeded the first spring after application and tame mustard the second season after application. A field bioassay (a test strip grown to maturity) is recommended the year before growing any crops other than those listed above. Contact manufacturer for additional information on recropping intervals (1-877-371-2273).

Do not apply Viper more than once per year.

Environmental Precautions

Viper tank mixture is highly toxic to non-target plants. Observe buffer zones specified under Directions for Use.

Runoff: Prevent contamination of aquatic and sensitive terrestrial areas through using the recommended buffer zones. Coarse textured soil are more susceptible to leaching.

Toxicity

Solo: Very low toxicity by ingestion. Acute oral LD_{50} (rats) = > 5,000 mg/kg. Low toxicity by contact.

Basagran Forte: Moderately toxic by ingestion. Acute oral LD_{50} (rats) = > 1,089 mg/kg. Moderately toxic by contact.

Storage

Do not freeze. Store in a cool, dry place above 5°C.

Insecticide Index

Name	Page/s	Name	Page/s
Chemical Insect Control in Alberta	290	<i>dimethoate</i>	308
Chemical control	290	ECO Bran	314
Safety	290	<i>endosulfan</i>	336
Bee safety	290	Furadan	315
Toxicity of pesticides to honeybees.....	291	Grapple	303
Livestock and residues.....	292	Grapple ₂	303
The guide	292	<i>imidacloprid</i>	303
Economic threshold.....	292	<i>imidacloprid + deltamethrin</i>	305
Economic thresholds for forage and		Imidan 50-WP Instapak.....	316
special crops.....	292	Lagon 480E.....	308
Economic thresholds for cereals and		Lannate	317
corn crops	293	Lorsban 4E	318
Economic thresholds for oilseed crops.....	294	<i>malathion</i>	320
Insecticide Group Classification by		Malathion.....	320
Mode of Action.....	295	Matador 120EC.....	322
Insecticide Selector Chart.....	297	<i>methamidophos</i>	325
<i>acephate</i>	327	<i>methomyl</i>	317
<i>acetamiprid</i>	304	Monitor	325
Actara	301	Movento 240 SC	326
Admire 240 Flowable.....	303	<i>naled</i>	313
Alias 240 SC.....	303	<i>novaluron</i>	331
<i>aluminum phosphide</i>	328	Nufos 4E	318
Ambush.....	330	Orthene.....	327
Assail 70 WP	304	<i>permethrin</i>	330
<i>carbaryl</i>	314,333	Perm-Up	330
<i>carbofuran</i>	315	<i>phorate</i>	335
<i>chlorantraniliprole</i>	306	<i>phosmet</i>	316
<i>chlorpyrifos</i>	318	Phostoxin	328
Citadel 480 EC	318	Pounce	330
<i>clothianidin</i>	337	Pyrinex 480 EC	318
Concept.....	305	Rimon 10 EC.....	331
Coragen	306	Ripcord	332
Counter	307	Sevin XLR Plus	333
Cygon 480 - Ag.....	308	Silencer 120EC.....	322
Cygon 480 EC	308	<i>spirotetramat</i>	326
<i>cyhalothrin lambda</i>	322	<i>terbufos</i>	307
<i>cypermethrin</i>	332	<i>thiomethoxam</i>	301
Decis	310	Thimet 15G.....	335
<i>deltamethrin</i>	310	Thiodan.....	336
Diazinon	312	Thionex EC	336
<i>diazinon</i>	312	Titan ST	337
Dibrom.....	313		

Chemical Insect Control in Alberta

The degree of infestation and severity of insect damage vary drastically from area to area and season to season. Most pests, such as grasshoppers, cutworms and Bertha armyworms, require control during periods of abundance that may last from one to several years. Other pests, like flea beetles, require control annually in some parts of Alberta.

Chemical control

A number of factors should be considered once the decision to apply an insecticide has been made. Insecticides will kill the pest insect if applied properly at a stage when the pest is susceptible. An application made too early or too late in the life cycle may not provide adequate control and would be wasteful. Follow label instructions for proper application. Other factors to consider include: ability of the insecticide to penetrate through the plant foliage, weather conditions, age and size of the insect, wait period to grazing or harvest and dosage required when making an application decision. If insects are moving into crops or emerging over an extended period, several applications in the same season may be necessary since most insecticides have limited residual properties when applied to foliage.

Safety

In general, insecticides are more toxic to humans, wildlife, fish, bees and other non-target organisms than herbicides or fungicides. Follow label directions for safety precautions associated with application of each insecticide. Refer to the introductory section of this book for general information on safety precautions associated with pesticide use.

Bee safety

The insecticides used to protect crops from damaging outbreaks of insect pests can also kill some beneficial insects. The objective of the insecticide application is to remove the problem insects from the crop with the least possible impact to beneficial insects such as honeybees and leafcutter bees. Because bees play a critical role in pollinating certain crops, it is important to ensure that an insecticide application has a minimum impact on population numbers. Although it may not be possible to totally eliminate the effect of insecticides on beneficial insects, the impact can be greatly reduced when the agricultural producer, pesticide applicator and beekeeper work together.

Beekeepers should:

- Talk with the landowners near their bee yards before spray season and provide the producers with their phone number.
- Ask producers if spraying to control insects is likely this year.
- Ask the producer to provide them with notification 48 hours in advance of applying an insecticide.

Producers and applicators should:

- Check for potential insect infestations in field crops early and frequently, and determine what the economic thresholds are for problem insects so that a spray program can be planned should it be required.
- Notify beekeepers of intentions to spray 48 hours in advance of spraying.
- Avoid application of insecticides to crops in bloom or to fields containing blooming weeds, which are attractive to foraging bees. Where feasible, use a preventative program early in the season when insecticides may be as effective and crops are not blooming.
- Spray late in the day or early in the morning when the temperature is below ideal foraging temperatures to reduce direct exposure to bees. Honeybees are most active when the temperature is above 18°C (72°F), usually in the heat of the day. As a general rule, evening applications are less hazardous than morning applications.

- Where there is a risk to bees, use an insecticide that has short residual activity to reduce the impact on the bees and to reduce possibilities of residues occurring in honey and pollen.
- Learn about pollination requirements of the different crops grown and about honeybees and leafcutter bees.

Caution

Unusually low temperatures during and immediately following applications cause insecticides to remain toxic to bees for a much longer period than normal. High temperatures will extend the foraging period, and application time must be adjusted accordingly. Prevent insecticides from drifting into adjacent blooming crops, roadsides and pastures with weeds in bloom, water used by bees, leafcutter shelters or apiaries by maintaining a reasonable distance from field boundaries and allowing for the potential movement of insecticides by wind. For more information, contact the Alberta Ag-Info Centre at 310-FARM (3276).

Rights and good practice

By law, persons, provided they do not contravene any land use by-laws, regulations or generally accepted practices, may operate an agricultural operation (including the application of pesticides). It's important to follow label directions and good practices regarding protection of pollinator species from insecticide applications.

Laws generally allow persons to obtain a benefit on their property, provided that the benefit is not achieved at the expense of adjacent landowners. Ensure that pesticides are used in a manner where drift does not occur.

Notification ensures that hazards are identified prior to spraying so that farmers or their custom applicators can adjust application practices to prevent problems, and beekeepers can adjust practices to accommodate spraying. Notification does not mean seeking permission to spray. Producers have the legal right to apply pesticides on their property.

Toxicity of Pesticides to Honeybees

Highly toxic	Moderately toxic	Non-toxic
Severe losses may be expected if the following materials are used when bees are present at treatment time or within a few days thereafter:	These can be used around bees if dosage, timing, and method of application are correct, but do not apply them directly on bees, in the field or at the colonies:	These are relatively non-toxic to honeybees:
Actara	Endosulfan 50W	Bravo 500
Admire	Lannate	Captan
Alias 240 SC	Thiodan	Coragen
Assail 70 WP, Ambush 500EC	Thionex EC	Dithane DG
Citadel 480EC		Gavel 75 DF
Clutch		Kumulus DF
Concept		
Cygon 480		
Decis 5EC		Manzate 200 DF
Furadan 480F		Manzate 200 WP
Grapple, Grapple ₂		Movento 240 SC
Imidan 50 WP		Penncozeb 75DF
Lorsban 4E		Polyram DF
Malathion 25W		Ridomil Gold 480 EC
Matador 120EC		Ridomil Gold MZ
Nufos 4E		Ronilan EG
Pounce		Rovral
Pyrinex 480EC		Senator 70WP
Ripcord 400EC		
Sevin XLR Plus		
Silencer 120EC		

Notification is a two-way street – both the beekeeper and farmer have to make efforts to protect pollinators.

Note: In many cases, beekeepers cannot move or cover their bees, especially during honey flow, so timing and accuracy of an insecticide application, plus selection of the safest insecticide where there is risk to bees, are the only ways to safeguard bees.

Livestock and residues

The number of days between the application of an insecticide and harvesting, feeding to livestock or grazing is given on the label. These restrictions must be followed to prevent illegal residues in crops and livestock and to eliminate hazards to consumers.

The guide

This guide only includes the major insecticides registered for use on field crops in Alberta. Not all insects controlled are listed for each insecticide.

Economic threshold

Before making a decision to apply an insecticide, producers need to know if the application would be economically justified. In addition to the expected dollar value of the crop, the producer needs to determine whether the insects present will cause a yield loss greater in value than the cost of control. The economic thresholds listed below will assist in making this decision.

Thresholds are given as the number of insects/unit of measure (such as #/plant or #/m²) or, for insects that are difficult to sample, the amount of damage evident. Chemical controls are generally only warranted when numbers meet or exceed the threshold level. Remember to sample throughout the field (minimum of 10 samples per 160 acres) to obtain an average infestation level.

Economic Thresholds for Insect Pests of Forage and Special Crops		
Insect	Economic threshold	Comments
Alfalfa weevil	Alfalfa hay crops: Apply controls when 25 - 50% of leaves on upper one-third of stem show damage or when 50 - 70% of terminals show injury. Alfalfa seed crops: 20 - 25 larvae per 90° sweep or when 35 - 50% of foliage tips show damage.	Alfalfa hay crops: 20 - 30 larvae per sweep cause a 12% leaf loss; 50 - 75 larvae per sweep cause a 30% leaf loss; 56 larvae per stem will return treatment costs.
Aphids	Canary grass: 50 per head between heading and soft dough.	
Beet leafminer	Sugar beet: Only infestations causing more than 25% defoliation require treatment.	
Grasshoppers	Alfalfa: See Cereals and Corn table. Safflower: 15/m.	
Pea aphid	Alfalfa: 75 - 100 aphids per plant. Field peas: 1 - 4 aphids per 20 cm stem tip when 50 - 75% of plants have begun to flower.	
Plant bugs	Alfalfa seed: 5 nymphs per sweep (any or all species of plant bugs) when alfalfa is in bud or bloom.	
Red clover thrips	Red clover seed fields: 50 - 80 thrips per raceme.	Threshold levels have occurred only during years of early spring drought on dryland.
Sweetclover weevil	Seedling crop (cotyledon stage): 1 weevil per 5 seedlings under slow growing conditions or 1 weevil per 3 seedlings under normal growing conditions. Newly emerged 2nd-year sweetclover: 9 - 12 weevils per plant.	

Economic Thresholds for Insect Pests of Cereals and Corn Crops

Insect	Economic threshold	Comments
Aphids		
Birdcherry-oat	Seedling: 20: Boot: 30 (aphids per stem)	Do not treat for aphids in cereals after the soft dough stage. Aphid populations decrease rapidly as heads mature. Birdcherry-oat aphid and greenbug vector barley yellow dwarf virus. Greenbug injects a toxin that stunts plants.
Corn leaf	Seedling: 20: Boot: 30 (aphids per stem)	
English grain	Seedling: 30: Boot: 50 (aphids per stem)	
Greenbug	Seedling: 5 - 15: Boot: 10 - 25 (aphids per stem)	
Russian wheat	Spring cereals - Seedling: 10 - 15%; Boot: 15 - 20% (% plants infested) Winter cereals - Seedling: 15 - 20% after October 1st	
Armyworm	11/m ²	
Barley thrips	Mean of 7.5 thrips per stem based on a sample size of 50 stems, chemical control = \$5.75/ac and market value = \$1.90/bushel	Infestations of one thrip per stem have caused losses of 0.4 - 1.25 bushels/ac.
Cutworms		
Pale western	3 - 4/m ²	8.4 PWC larvae/m ² caused 25% loss in wheat; 30 PWC larvae/m ² caused 100% yield loss. PWC and RBC : well established crops with good moisture can tolerate higher numbers.
Red-backed	5 - 6/m ² moisture	
European corn borer	Dryland grain corn: when 50% of plants show leaf feeding	
Grain stink bug	Wheat: 1 per head caused losses greater than 30%	
Grasshoppers	13/m ² in fields or 25/m ² in roadsides	
Hessian fly	None available	Several larvae per plant may kill barley and wheat.
Orange wheat blossom midge	1 adult seen per every 4 - 5 heads of wheat	Infestations of 30, 60 and 90% reduced spring wheat yields by 40, 65 and 80% respectively in Saskatchewan.
Wheat stem sawfly	None available	Plant resistant varieties if 10 - 15% of the previous crop was cut by sawfly. Infested stems of wheat averaged 17% yield loss.

Economic Thresholds for Insect Pests of Oilseed Crops

Insect	Economic threshold	Comments
Aphids	Canola: rarely a problem. Flax: 8 - 10 aphids per stem at green boll stage.	Aphids on the top 10 - 15 cm of canola plants near the end of flowering do not cause yield losses.
Army cutworm	Seedling mustard: less than 5/m ² .	
Bertha armyworm	20 larvae/m ² consume 65 kg Argentine canola seed/ha.	Economic threshold for Polish canola types is likely 25% less than for Argentine.
Diamondback moth	200 - 300 larvae/m ² in canola; if leaves are on plants, feeding on pods is limited.	Threshold may be lower for Polish than for Argentine type canolas. Timing of the infestation also influences the threshold.
Flea beetles	50% leaf tissue consumed; less if growing and moisture conditions are poor.	Damage is usually most severe along field margins and frequently only field margins require treatment.
Lygus bug	Canola: 1.5 and 2.0 lygus bugs per sweep at the end of bloom and early pod development, respectively (crop stage 4.4 and 5.1). Threshold during pod ripening (crop stage 5.2) appears to be greater than 3 per sweep.	A threshold for the bud stage has not been determined. Experience in 1998 indicates that heavy adult numbers can cause severe bud blast under dry, hot conditions. At least 10 sets of 15 sweeps, each taken anywhere in a field, are necessary to have an accurate assessment of Lygus numbers. Controls should not be required within 10 days of swathing.
Sunflower beetle	1 adult per 2 - 3 seedlings or over 10 larvae per plant.	Severe leaf damage may occur to plants in the 2 - 6 leaf stage when adults are numerous, or at any time when larvae are numerous.
Sunflower maggots	None established	
Sunflower midge	Losses are more severe around field edges; estimate losses by sampling heads and classifying them on the degree of head distortion.	
Sunflower seed weevils (grey & red)	Confectionery sunflower: 1 adult per head. Oil sunflower: 10 - 12 seed weevil adults per head.	(R - 5.1 stage). Re-infestation may occur with a high weevil population. Re-check fields when 80 - 100% of heads are at the R - 5.5 stage. Apply treatment at early anthesis when 30 - 70% of sunflower heads are in early pollen formation.

Insecticide Group Classification by Mode of Action

Mode of action	Chemical family	Active ingredients	Found in
Group 1A, 1B			
Acetylcholinesterase inhibitors. These chemicals inhibit an enzyme, interrupting the transmission of nerve impulses.	Carbamates (Group 1A)	carbaryl	ECO Bran, Sevin XLR
		carbofuran	Furadan
		methomyl	Lannate
	Organophosphates (Group 1B)	acephate	Orthene 75%
		chlorpyrifos	Citadel 480 EC, Lorsban 4E, Nufos 4E, Pyrinex 480 EC
		diazinon	Agrox B-2*, Agrox CD*, DCT*, Diazinon
		dimethoate	Cygon 480, Cygon 480 EC, Cygon Hopper Stopper, Dimethoate Plus, Lagon 480E
		malathion	Malathion
		methamidophos	Monitor
		naled	Dibrom
		phorate	Thimet
		phosmet	Imidan 50-WP Instapak
		terbufos	Counter
Group 2A			
These chemicals interfere with GABA receptors of insect neurons, leading to repetitive nervous damage.	Chlorinated cyclodienes	endosulfan	Thiodan, Thionex EC
Group 3			
These chemicals act as a axonic poison by interfering with the nervous system, leading to paralysis.	Synthetic pyrethroids	cyhalothrin-lambda	Matador 120EC, Silencer 120EC
		cypermethrin	Ripcord
		deltamethrin	Concept, Decis
		permethrin	Pounce, Ambush 500EC, Perm-UP
Group 4			
These chemicals binds to nicotinic acetylcholine receptor, disrupting nerve transmission.	Chloronicotines	acetamiprid	Assail 70 WP
		clothianidin	Poncho, Prosper*, Prosper FX*, Titan ST, Clutch
		imidacloprid	Admire, Alias 240 SC, Concept Gaucho 480*, Gaucho CS FL*, Genesis, Grapple, Grapple ₂
		thiomethoxam	Actara, Helix*, Helix XTra*

(continued)

* Contains insecticide and fungicide combination.

Insecticide Group Classification by Mode of Action

Mode of action	Chemical family	Active ingredients	Found in
Group 8B			
Unknown	Fumigant	aluminum phosphide	Phostoxin
Group 15			
These chemicals act as insect growth regulators. They disrupt chitin synthesis.	Insect growth regulator	novaluron	Rimon
Group 23			
Lipid biosynthesis inhibitor.	Tetramic acid	spirotetramat	Movento
Group 28			
Acts on the ryanodine receptor of the insect muscle cell, leading to muscle paralysis.	Diamide	chlorantraniliprole	Coragen

* Contains insecticide and fungicide combination.

Insecticide Selector Chart

Cereals

Products	Chlorpyrifos***	Cygon/Lagon	Decis	Eco Bran	Lannate	Malathion	Matador/Silencer	Pounce/Perm-UP/Ambush	Ripcord	Sevin XLR Plus
wheat, barley and oats										
aphids		C				C				
brown wheat mite	C									
cereal leaf beetle						C				
cutworms	C		C					C	C*	
grasshoppers	C	C	C	C		C	C		C	C
thrips		C			C					
true armyworm	C				C	C	C			C
wheat midge**	C	C								
wireworm										
fall rye										
aphids						C				
cutworm								C		
grasshopper		C		C		C				C
true armyworm						C				C

C = Control, S = Suppression

* Wheat and barley only

** Wheat only

*** Chlorpyrifos products include Lorsban, Pyrinex, Nufos and Citadel

Forages, Pasture & Rangeland

Products	Cygon/Lagon	Decis	Diazin	Dibrom	Eco-Bran	Malathion	Matador/Silencer	Ripcord	Sevin XLR Plus
forages									
alfalfa									
alfalfa weevil		C				C	C		
aphids	C			C		C	C		
blotch leafminer	C					C			
grasshopper	C					C	C		C
leafhopper	C			C		C	C		
lygus bugs	C	C		C		C	C		
plant bugs	C						C		
spider mites						C			
spittle bug						C			
clover									
aphids						C*			
leafhoppers						C*			
spider mites						C*			
spittle bug						C*			
sweet clover weevil	C					C			
grasshoppers						C*			
timothy									
grasshoppers							C		
forage grasses									
grasshoppers									C
pasture, rangeland, headlands and roadside									
grasshoppers	C	C	C	C	C	C	C	C	C

* Only registered for Malathion 500E

Insecticides

Insecticide Selector Chart

Oilseeds

Products	Chlorpyrifos*	Cygon/Lagon	Decis	Eco-Bran	Furadan	Lannate	Malathion	Matador/Silencer	Monitor	Pounce/Perm-Up/Ambush	Ripcord	Sevin
canola (including herbicide tolerant)												
alfalfa looper	C					C						
aster leafhopper		C										
beet webworm			C			C						
Bertha armyworm	C		C			C		C	C		C	
cabbage looper						C						
cabbage seedpod weevil			C					C				
clover cutworm			C			C						
cutworm	C									C	C	
diamond-back moth (larvae)	C		C				C	C				
flea beetle			C		C		C	C		C	C	C
grasshopper	C	C	C	C			C	C	C		C	
lygus bugs	C		C					C				
red turnip beetle					C							
true armyworm	C											
turnip aphids		C										
variegated cutworm	C											

Products	Chlorpyrifos*	Cygon/Lagon	Decis	Eco-Bran	Furadan	Lannate	Malathion	Matador/Silencer	Monitor	Pounce/Perm-Up/Ambush	Ripcord	Sevin
flax												
beet webworm			C									
Bertha armyworm	C					C						
clover cutworm			C									
cutworm	C		C							C		
grasshopper			C				C	C				
true armyworm												
variegated cutworm	C											
potato aphid		C										
mustard												
beet webworm			C									
Bertha armyworm			C					C				
cabbage seedpod weevil			C					C				
clover cutworm			C									
diamond-back moth (larvae)			C				C	C				
flea beetle			C		C		C	C				
grasshopper			C				C	C				
lygus bugs			C					C				
red turnip beetle					C							

C = Control, S = Suppression

* Chlorpyrifos products include Lorsban, Pyrinex, Nufos and Citadel

Insecticide Selector Chart

Sugar Beets

Products	Chlorpyrifos*	Decis	Malathion	Pounce/PermUP/Ambush	Thiodan/Thionex EC
sugar beets					
aphids					C
cutworm	C	C		C	
flea beetle			C		

Pulses

Products	Chlorpyrifos*	Cygon/Lagon	Decis	Lamate	Malathion	Matador/Silencer	Pounce/Perm-Up/Ambush	Sevin XLR Plus
peas								
alfalfa looper				C				C
cutworm						C	C	
grasshoppers						C		
leafhopper					C			
pea aphids		C		C	C	C		
pea leaf weevil						C		
spider mite					C			
lentils								
cutworm	C		C			C	C	
grasshopper	C		C		C	C		
lygus bugs						C		
pea aphids						C		
potato leafhopper						C		
chickpeas								
cutworm						C		
grasshopper						C		

C = Control, S = Suppression

* Chlorpyrifos products include Lorsban, Pyrinex, Nufos and Citadel

Insecticide Selector Chart

Potatoes

Products	Actara	Admire/Alias/Grapple/Grapple ₂	Assail	Chlorpyrifos*	Concept	Coragen	Cygon/Lagon	Decis	Diazinon	Dibrom	Furadan	Imidan	Lannate	Malathion	Matador/Silencer	Monitor	Movento	Orthene	Pounce/Perm UP/Ambush	Rimon	Ripcord	Sevin XLR Plus	Thimet	Thionex/Thiodan	Titan
potatoes																									
aphids	C	C	C		C		C		C			C	C	C		C	C	C						C	C
cutworm				C															C		C				
Colorado potato beetle	C	C	C	C	C	C		C	C	C	C	C		C	C	C			C	C	C	C		C	C
European corn borer					S	C														C		C			
leafhoppers	C	C			C		C	C	C	C	C	C	C	C	C	C		C	C		C	C		C	C
potato flea beetle		C		C	C			C	C	C	C	C	C	C	C	C		C	C		C	C		C	C
variegated cutworm													C								C				
wireworms																							C		S
spider mites														C											
tarnished plant bug				C	C		C			C					C			C	C			C		C	

C = Control, S = Suppression

* Chlorpyrifos products include Lorsban, Pyrinex, Nufos and Citadel

Actara



Caution Irritant



Caution Poison

Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Actara 240 SC (PCP #28407)	Syngenta Crop Protection	Thiomethoxam: 240 g/L	Soluble concentrate	2 x 2.04 L
Actara 25 WG (PCP # 28408)		Thiomethoxam: 25%	Water dispersible granules	4 x 850 g

Crops, Insects Controlled and Rates

Product	Crop	Insects controlled	Application method/ rate per acre	Specific remarks
Actara 240SC	Potato	Colorado potato beetle, aphids (including green peach, potato, buckthorn and foxglove aphid), potato leafhopper	Soil application: 3.4 - 4.4 mL/100 m row. For 90 cm row spacing, apply 151 - 196 mL/ acre.	Apply as in in-furrow spray at planting. Use the higher rate for extended residual control. Apply in sufficient water to ensure good coverage.
	Potato	Colorado potato beetle, aphids (including green peach, potato, buckthorn and foxglove aphid), potato leafhopper	Foliar application: 44 mL/acre	Apply before pests reach damaging levels. Scout fields and treat again 7 - 10 days later if populations rebuild to potentially damaging levels. Potato leafhopper: Control may require the use of two applications made at a 7 - 10 day interval.
Actara 25WG	Potato	Colorado potato beetle, aphids (including green peach, potato, buckthorn and foxglove aphid), potato leafhopper	Foliar application: 43 g/acre	Apply before pests reach damaging levels. Scout fields and treat again 7 - 10 days later if populations rebuild to potentially damaging levels. Potato leafhopper: Control may require the use of two applications made at a 7 - 10 day interval.

Registered Tank Mixes

Pest	Product/rate	Remarks
Colorado potato beetle, potato leafhopper, aphids (including green peach, potato, buckthorn and foxglove aphid), rhizoctonia stem and stolon canker, black scurf and suppression of pink rot	Actara 240 SC @ 3.4 - 4.4 L/100 m. row	Use the higher rate for extended residual control of insects.
	Quadris Flowable @ 4 - 6 mL /100 m. row	Use the higher rate of Quadris Flowable when risk of disease is high.
	Ridomil Gold 480 @ 4 mL/100 m. row	

Application Information

Actara 240 SC – Soil application

How to Apply: Applied by ground equipment only. Do not apply by air.

Water Volume: Use a minimum of 40 L of water per acre. For best results, apply as an in-furrow spray at planting. Do not follow a soil application of Actara 240 SC with a foliar application of Actara 240 SC or Actara 25WG. Use the higher rate for extended residual control.

Actara 25 WG

How to Apply: May be applied by ground equipment or by air.

Water Volume: For ground application, use a minimum of 40 L of water per acre. For aerial application, use a minimum of 8 L of water per acre. In situations where a dense canopy exists and/or pest pressure is high, use greater water volumes.

Insecticides

Actara (cont'd)**Application Tips**

Actara 25 WG: Do not exceed a total of 85 g of Actara per acre during each growing season. Allow at least 7 days between applications. For aerial application, avoid making applications under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur. Avoid spray overlap. Do not apply Actara after pre-bloom (early pink growth stage) or before post-bloom (petal fall growth stage).

Potato Seed Piece Treatment: Choose the appropriate rate for Actara 240 SC from the chart on the label, based upon the seeding rate. Use high rate for extended residual control. Do not apply more than 24.4 mL product /100 kg seed pieces or 79.7 mL product per acre. Apply only in areas with adequate ventilation or in areas that are equipped to remove spray mist or dust. Apply Actara 240SC as a water-based slurry utilizing standard slurry seed treatment equipment which provides uniform seed coverage.

How it Works

Actara is a systemic neonicotinoid insecticide. It controls the sucking and chewing insects through contact and ingestion.

Restrictions

Rainfall: Avoid application of Actara when heavy rain is forecast. Actara 25 WG is rainfast once spray has dried on treated plants.

Pre-harvest Interval: Do not harvest within 7 days of application.

Re-entry: Do not enter or allow worker entry into treated areas for 12 hours after foliar application.

Re-cropping: Treated areas may be replanted immediately following harvest or as soon as practical following the last application with any crop listed on this label or to sorghum, wheat, barley and canola. Any cover crop planted for erosion control or soil improvement may be planted as soon as practical following the last application. However, the cover crop may not be grazed or harvested for food or feed. For all other crops, a 120-day plant-back interval must be observed.

Environmental Precautions

Actara is highly toxic to certain aquatic organisms. Do not contaminate water with the product or its container. Do not clean application equipment near surface water. Avoid contamination via drains from farmyards and roads. Observe buffer zones specified on the Actara label.

Runoff: Do not apply Actara directly to freshwater habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Leaching: Thiamethoxam is moderate to very persistent in soil and is highly mobile. The use of Actara may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or where the depth to the water table is shallow.

Toxicity

This product has a low toxicity. Oral LD₅₀ (rats) >5,000 mg/kg. Dermal LD₅₀ (rabbits) = >2,000 mg/kg. Toxic to bees.

Storage

Store in cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of reach of children.

Admire 240 Flowable /Alias 240 SC/ Grapple/Grapple₂



Caution Poison

Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Admire 240 (PCP # 24094)	Bayer CropScience Inc	Imidacloprid; 240 grams/L	Flowable	1 L, 3.785 L
Admire 240 SPT (PCP #27702)	Bayer CropScience Inc		Flowable	1 L, 3.785 L
Alias 240 SC (PCP # 28475)	MANA Canada		Suspension concentrate	1 L, 3.785 L
Grapple (PCP # 28726) Grapple ₂ (PCP # 29048)	Cheminova Canada		Suspension concentrate	1 L, 3.785 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Specific remarks
Soil application			
Potato	Colorado potato beetle, aphids (including green peach, buckthorn, foxglove and potato aphid), potato leafhopper, potato flea beetle	7.5 - 12 mL/ 100 m row or 345 - 525 mL/acre (based on 90 cm row spacing)	The higher rate is recommended when extended length of control is needed. Do not apply more than once per season as a soil application. Do not follow a soil application with a foliar application.
Foliar application			
Potato	Colorado potato beetle, aphids (including green peach, buckthorn, foxglove and potato aphid)	81.0 mL/acre	For optimal control, good coverage of the foliage is needed. A maximum of two foliar applications may be made per crop per season. Aphid control: Two applications at least 7 days apart may be required to achieve control.
Potato seed piece treatment			
Potato	Colorado potato beetle, aphids (including green peach, buckthorn, foxglove and potato aphid), potato leafhopper and potato flea beetle	26 - 39 mL per 100 kg seed pieces	Apply only in areas with adequate ventilation or in areas that are equipped to remove spray mist or dust. Do not apply any subsequent application of imidacloprid or other Group 4 insecticide following a Group 4 potato seed piece treatment.

Registered Tank Mixes

Admire 240 can be tank-mixed with Ridomil Gold 480 for suppression of Pink Rot (*Phytophthora erythroseptica*). Please refer to Ridomil Gold 240 label for use instructions and precautions.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water Volume: Water volume should be adequate to provide sufficient coverage.

Application Tips

Soil application: Apply Admire 240/Alias 240 SC/Grapple as a narrow band in-furrow. For best results, direct spray on the seed pieces or seed potatoes in the furrow.

Foliar Application: Apply specified dosage of Admire 240/Alias 240 SC/Grapple/Grapple₂ as pest numbers begin to increase but before a damaging population becomes established. Scout fields and repeat if needed. Do not make a foliar application of Admire 240/Alias 240 SC/Grapple/Grapple₂ following a soil or seed piece treatment application of product in the same crop. Allow at least 7 days after the last application and before harvesting the crop.

Admire 240 Flowable /Alias 240 SC/Grapple/Grapple₂ (cont'd)

Potato Seed Piece Treatment: Do not dilute with any more than 3 parts water to 1 part Admire 240/Alias 240 SC/Grapple/Grapple₂. Agitate or stir spray solution as needed. The higher rate is recommended when extended length of control is needed. Do not apply more than 0.47 L/acre per year. Check the label to select an effective treatment rate based upon seeding rate and desired duration of control.

How it Works

Imidacloprid is a systemic chloronicotinyl insecticide.

Restrictions

Rainfall: Do not apply product or plant treated seed pieces when heavy rainfall is forecast for the next 48 hours.

Grazing: Do not use treated seed pieces for food, feed or fodder.

Re-entry Interval: Do not enter treated areas for 24 hours after foliar application.

Re-cropping: Plant-back interval for cereal grains (wheat, barley, oats) - minimum of 30 days; peas and beans - minimum of 9 months. Other food and feed crops - 12 months. Green manure and other cover crops not intended for human or animal consumption can be grown without plant-back interval. Do not graze or harvest such cover crops for food or feed.

Environmental Precautions

Imidacloprid is toxic to aquatic invertebrates and birds. Keep out of lakes, streams, ponds or other aquatic systems.

Runoff: Do not apply to terrain where there is a potential for surface runoff to enter aquatic systems.

Leaching: Imidacloprid demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of Admire 240/Alias 240 SC/Grapple/Grapple₂ in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Toxicity

Acute oral toxicity LD₅₀ (rats) = 4,143 - 4,870 mg/kg. Dermal toxicity LD₅₀ (rabbits) = 200 mg/kg. Highly toxic to bees.

Storage

Store in cool, dry place and avoid cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of reach of children, preferably in a locked storage area.



Warning Poison

Assail 70 WP

Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Assail 70 WP (PCP # 27128)	E.I. duPont Canada	Acetamiprid: 70%	Wettable powder	340 g - 1.2 kg

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate	Specific remarks
Potato	Aphids	22.6 - 34.8 g/acre	Use the higher rates when the majority of the Colorado potato beetle population is in the adult stage and for heavy pest pressure. Do not make more than 2 applications per crop year. Do not exceed a total of 69.5 grams of product per acre per season.
	Colorado potato beetle	16 - 32 g/acre	

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with ground equipment. Aerial application for potatoes only.

Water Volume: Ground: 80 L/acre. Air (Potatoes): 19 L/acre.

Application Tips

Thorough coverage is important to obtain optimum control. Do not apply more than once every 7 days. The specific length of residual control depends on environmental factors, plant growth, dosage rate and degree of insect infestation.

How it Works

Assail 70 WP is absorbed into plant tissue and translocated to protect tender new shoots, passing through leaves to provide underside coverage. Assail works on insect pests through both contact and ingestion.

Restrictions

Rainfall: Avoid application of Assail 70 WP when heavy rain is forecast.

Pre-harvest Interval: 7 days.

Re-entry: Do not enter treated areas for 12 hours after application.

Re-cropping: There are no rotational crop plant restrictions for this product.

Environmental Precautions

Assail is toxic to aquatic organisms and to non-target terrestrial plants. A buffer zone of 20 metres for application by ground-boom sprayer should be established between the last spray swath and the edge of aquatic systems. A buffer zone of 2 metres is required between the last spray swath and the edge of terrestrial habitats.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD_{50} (rats) = 1,064 mg/kg. Acetamiprid is toxic to bees exposed to direct treatment, drift, or residues in flowering crops or weeds.

Storage

Do not store in or around the home. Store unused product in a cool, ventilated, dry, locked area. Do not allow prolonged storage in areas where temperatures frequently exceed 46°C.

Concept

Group 3, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Concept (PCP # 29611)	Bayer Crop Science	Imidacloprid: 75 g/L Deltamethrin: 10 g/L	Suspension	5.26 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate (mL/acre)	Specific comments
Potato	Colorado potato beetle, aphids, leafhopper, potato flea beetle, tarnished plant bug, European corn borer (suppression)	260	Apply once the target population has reached economic threshold. Repeat if pest population levels return to damaging levels. Minimum of 5 days between applications. Do not apply more than 3 applications per year.

Concept (cont'd)**Registered Tank Mixes**

None registered.

Application Information

How to Apply: Apply with ground equipment only.

Water Volume: Ground: 40 L/acre minimum.

How it Works

Imidacloprid is a systemic chloronicotinyl insecticide, and deltamethrin is a non-systemic synthetic pyrethroid that works by contact and ingestion.

Application Tips

Thorough coverage of all plant parts is required for optimum performance.

Restrictions

Pre-harvest Interval: Potato: 7 days.

Re-entry: Do not enter treated areas for 24 hours after application.

Environmental Precautions

Highly toxic to fish and other aquatic organisms. Do not allow spray drift to come into contact with aquatic areas. Do not apply where runoff is likely to occur.

Toxicity

Acute oral LD₅₀ (rats) = 2,500 mg/kg. Dermal LD₅₀ (rabbits) = > 4,500 mg/kg. Toxic to honey bees directly exposed to Concept during application or Concept residues present on blooming crops or weeds.

Storage

Do not store in or around the home. If stored for 1 year or longer, shake well before using. Do not store product below 0°C.



Warning Poison

Coragen

Group 28

Formulation

Product	Company	Active ingredient	Formulation	Container size
Coragen (PCP # 28982)	E.I. duPont Canada	Chlorantraniliprole: 200 g/L	Suspension	0.5, 3.79, 100 Litres

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate	Specific comments
Corn - all types	Corn earworm European corn borer	101 to 151 mL/acre	Time the application to coincide with peak egg hatch. Thorough coverage is required for optimum control. Reapply if monitoring indicates it is necessary.
Potatoes	Colorado potato beetle European corn borer	101 to 151 mL/acre	Begin applications when treatment thresholds have been reached. Thorough coverage is essential for optimum control.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with ground equipment or air.

Water Volume: Ground: 40 L/acre. Air: 20 L/acre.

How it Works

Coragen moves into leaf tissue where it is available to chewing insects feeding on the leaf surface. Feeding on leaf tissues results in paralysis and death.

Application Tips

Coverage is important to obtain optimum control. Do not make more than 4 applications per season. Do not apply more than once every 5 days. Do not exceed a total of 0.45 litres Coragen per acre per season.

Restrictions

Rainfall: Avoid application when heavy rain is forecast.

Pre-harvest Interval: Potato: 14 days; Corn: 1 day.

Re-entry: Do not enter treated areas for 12 hours after application.

Re-cropping: There are no rotational crop plant restrictions for this product.

Environmental Precautions

Coragen is toxic to aquatic organisms. Do not apply this product directly to freshwater habitats. Refer to label for information on buffer zones. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay.

Leaching: The use of this product may result in contamination of groundwater, particularly in areas where soil is permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Acute oral LD₅₀ (rats) = > 5,000 mg/kg. Dermal LD₅₀ (rabbits) = > 5,000 mg/kg. Non toxic to honey bees, leafcutter bees and other beneficial insects.

Storage

Do not store in or around the home. Store unused product in a cool, ventilated, dry, locked area.



Danger Poison

Counter

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Counter (PCP # 15268)	AMVAC Corporation	Terbufos: 15%	Granules	20 kg Lock and load

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate	Specific comments
Sugar beet	Sugar beet root maggot, wireworms	45 g/100 metre row (based on 50 cm row spacing)	Apply in furrow at planting time 5 - 8 cm behind the seed drop zone after some soil has covered the seed. Do not place granules in direct contact with seed.

Registered Tank Mixes

None registered.

Counter (cont'd)**Application Information**

How to Apply: Apply with ground equipment only. Do not apply by air.

Application Tips

When a seed treatment is also used - mix the seed treatment with seed, then mix granules with treated seed. Empty hoppers of equipment while still in the field. Cover granules that may be exposed on the ends of the treated rows, turns and field loading or cleaning areas.

How it Works

Counter is a systemic, organophosphorus insecticide with effective initial and residual activity.

Restrictions

Rainfall: The effect of rainfall is not applicable - insecticide seed treatment.

Re-entry: Do not enter treated areas for 48 hours after application.

Re-cropping: There are no rotational crop plant restrictions for this product.

Grazing: Tops and beet pulp may be fed to livestock after harvest.

Pre-harvest Interval: 120 - 150 days.

Environmental Precautions

This product is highly toxic to birds, small mammals, fish and aquatic invertebrates. Only a small number of granules are sufficient to kill a small bird or small mammal. Do not contaminate any body of water or apply to any area not specified on the label. Do not apply this product in a way that will contact workers or other persons, either directly or through drift.

Toxicity

High acute mammalian toxicity. Acute oral LD_{50} (rats) = technical 1.6 mg/kg. Highly toxic to bees, fish, birds and other wildlife.

Storage

Store open bags in labelled, sealed drums or heavy plastic bags.

Cygon 480 - Ag/Cygon 480 EC/ Lagon480



Danger Poison

Group 1 B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Cygon 480 EC (PCP # 9807)	IPCO	Dimethoate: 480 g/L	Emulsifiable concentrate	10 L
Cygon 480 - Ag (PCP # 25651)	Cheminova		Emulsifiable concentrate	10 L
Lagon 480 (PCP # 9382)	United Agri Products		Emulsifiable concentrate	10 L

Crops, Insects Controlled and Rates

Field Crops	Insects controlled	Rates (mL/acre)	Pre-harvest interval	Maximum allowable applications per season	Remarks
Alfalfa (seed and forage production)	Aphids, leafhoppers, reduction of alfalfa weevil larvae, lygus bugs, plant bugs	172	2	2	Use a water volume of at least 81 L/ac with ground equipment for blotch leafminers. Do not apply during bloom.
	Blotch leafminers	222	2	1	
	Grasshoppers-nymphs	222	2	1	
	Grasshoppers-adults	344 - 364	7	2	
Alfalfa (seed production only)	Lygus plant bug, plant bug	445	28	1	
Canola	Aphids, leafhoppers, grasshoppers	344 - 364	21	3	The higher rate should be used when the proportion of mature and late nymphal stages in the population are high and spray penetration is inhibited by dense crop canopy.
Cereals: barley, oats, wheat	Aphids	172	2	2	
	Thrips	404	Forage: 7 Grain: 21	2	
Cereals: barley, oats, rye, wheat	Grasshoppers - adults	344 - 405	2	2	
	Grasshoppers - nymphs	222	2		
Cereals: wheat only	Orange blossom wheat midge	405	Forage: 7 Grain: 21	2	Applications should be made during the late afternoon or evening when air temperature exceeds 15° C and wind speed is less than 10 km/h.
Flax	Potato aphid	177	21	1	Apply from late flowering to early green bole stage
Peas (canning/field)	Aphids	111 - 172	3	2	Do not graze for forages for 21 days after last application.
Safflower	Grasshoppers (nymphs and adults)	222 - 404	21	2	Apply when hoppers are present as young or signs of insect damage are evident.
Clover (sweet, red, alsike)	Sweet clover weevil	344 - 445	28	2	
Pastures, waste areas	Grasshoppers-nymphs	222	2	1	
	Grasshoppers-adults	344 - 404	7	2	
Potatoes	Aphids, leafhoppers	222 - 444	7	3	

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with ground equipment or by air.**Water Volume:** Ground Applications. 80 L/acre. Aerial Applications: A minimum volume of 12 L/acre.

Application Tips

Use higher rates for adult insects, heavy infestation or dense canopy. Do not apply foliar spray during the heat of the day or when temperatures are exceedingly high.

How it Works

Dimethoate is a broad-spectrum systemic and contact organophosphate insecticide and acaricide.

Cygon 480 – Ag/Cygon 480 EC Lagon480 (cont'd)**Restrictions**

Rainfall: No rainfastness information is listed on the product label.

Re-cropping: No information is specified on the label.

Pre-harvest Interval: See above table.

Environmental Precautions

Dimethoate-containing formulations are highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rat) = 500 - 680 mg/kg. Technical = 180 - 336 mg/kg. Highly toxic to birds, bees and other animals. Do not use when bees are foraging.

Storage

Store between 4°C and 30°C, away from feed and food. Do not expose to direct sunlight.

Decis

Caution Irritant Danger Poison

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Decis 5 EC (PCP # 17734)	Bayer CropScience	Deltamethrin: 50 g/L	Emulsifiable concentrate	1, 2, 10, 200L and Bulk

Crops, Insects Controlled and Rates

Crops	Insects controlled	Rates (mL/acre)	Remarks
Decis 5 EC			
Alfalfa (seed production only)	Alfalfa weevil, lygus bugs	80 - 100	Use the higher rate when the alfalfa weevil is present. Apply in 40 120 L/acre water. Do not make more than 1 application per year.
Corn (field)	European corn borer	100 - 120	Apply when egg masses begin to hatch, but no later than when the first pinhole feeding is seen on the leaves. Apply in minimum of 97 L/acre of water. Do not apply more than 3 times per year.
Potatoes	Colorado potato beetle, leafhopper, potato flea beetle, tarnished plant bug	40 - 60	Apply when insects are present or signs of insect feeding are evident. Repeat as necessary to a maximum of 3 applications per year as a ground application. Maximum of 2 applications if applied by air. Use the higher rate under severe infestations.
Canola, rapeseed, mustard	Beet webworm, cabbage seedpod weevil, flea beetle, Bertha armyworm, clover cutworm, diamondback moth (larvae), grasshopper, lygus bugs	40 - 60	Application should be made when the insects are actively feeding. Under heavy infestations, use the higher rates. Apply once per year
Wheat, barley, oats, flax, lentils	Cutworm, clover cutworm (flax only), beet webworm (flax only)	80	Apply once per season when larvae are present and feeding. Do not disturb soil after application.
	Grasshoppers	40 - 60	Apply when the grasshoppers are in the 2-4 nymphal stage.

Crops	Insects controlled	Rates (mL/acre)	Remarks
Sugar beets	Cutworm	80	Apply once per season when larvae are present and feeding. Do not disturb soil after application.
Sunflower	Sunflower beetles	40	Apply when sunflower is cotyledons to 2 leaf stage. Apply once per season.
Rangeland, pasture and roadsides	Grasshoppers	40 - 60	Apply when the grasshoppers are in the 2-4 nymphal stage. The higher rate should be used when the proportion of mature and late nymphal stages in the population are high. Do not apply more than 3 times per year.

Application Information

How to Apply: Apply with ground or air equipment with the exception of alfalfa and corn, which require ground application only.

Water volume: Ground: Alfalfa - 40 - 120 L/ac; Field corn - 100 L/ac minimum; Potatoes - 80 - 200 L/ac, Canola, mustard - 40 L/ac; Cereals - 40 - 80 L/ac; Sugarbeets - 40 L/ac

Air: 4.4 - 8.8 L/ac.

Application Tips

Best control is achieved by morning or evening applications. Do not spray under a strong temperature inversion or when temperature exceeds 25°C. With severe flea beetle and grasshopper infestations, spray fence rows and a 15 metre strip into adjacent summerfallow and cropped fields.

How it Works

Deltamethrin is a non-systemic, synthetic pyrethroid that works by contact and ingestion. Speed of kill depends on target insect and environmental conditions. Death can occur within 2 hours.

Restrictions

Rainfall: Do not apply within 1 hour of rain.

Grazing: Beef and dairy cattle may graze treated fields immediately after application.

Pre-harvest Interval (days): alfalfa (20), barley (40), canola (7), flax (40), lentils (30), mustard (7), oats (31), potatoes (3), sunflower (70), wheat (40), sugarbeets (100).

Environmental Precautions

Decis is toxic to fish and aquatic organisms. Overspray or drift into aquatic areas must be avoided. Do not apply where streams, lakes, ponds or water used by livestock or for domestic purposes may be contaminated. Maintain a minimum 30-metre buffer for ground application and a minimum 100-metre buffer for aerial application. Applications should not be made when wind or rain could favour drift or runoff into lakes and ponds.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) Decis = 395 mg/kg. Severe eye and skin irritant. Toxic to bees and other beneficial insects. Do not apply when bees are foraging.

Storage

Do not store below freezing. Do not store near feed or food. Keep away from heat, sparks and open flames.

Diazinon



Danger Poison

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Diazinon 500E (PCP #11889)	United Agri Products	Diazinon: 50%	Liquid	4 L and 10 L
Diazinon 50W (PCP # 19576)		Diazinon: 500 g/L	Wettable powder	2 Kg
Diazinon 50 EC (PCP # 27538)	IPCO	Diazinon: 50%	Emulsifiable concentrate	10 L

Crops, Insects Controlled and Rates

Crops	Insects controlled	Rates per acre		
		Diazinon 500E	Diazinon 50W	Diazinon 50 EC
Beans	Aphids, mites, leafhoppers	445 mL	20g per 300 mL water per 4 L seed	445 mL
Corn, peas	Seed corn maggot	NR*		NR*
Potatoes	Aphids, flea beetles, Colorado potato beetles, leafhopper	445 mL	NR*	445 mL
Rangeland, pasture, ditch banks, roadsides, fence rows, wastelands	Grasshoppers	445 mL	NR*	445 mL

* Not registered

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: Water volume should be adequate to provide sufficient coverage.

Application Tips

Diazinon will work more effectively if the temperature is 20°C or more or when temperatures will reach or exceed this minimum.

How it Works

Diazinon is an organophosphate insecticide with systemic and contact activity.

Restrictions

Grazing: Dairy, beef cattle and sheep may be grazed or fed green forage immediately following application. Hay may be fed if not cut for 21 days following application.

Note: Do not spray livestock directly.

Pre-harvest Interval: Do not harvest crops for 3-14 days after the last application. See label for crop specific restrictions. Do not graze or feed immature crops within 14 days of harvest.

Re-cropping: No restrictions.

Environmental Precautions

Toxic to fish and wildlife. Birds feeding in treated areas may be killed. Do not contaminate any body of water.

Toxicity

Acute oral toxicity LD₅₀ (rats) = <50 mg/kg. Dermal toxicity LD₅₀ (rats) = <200 mg/kg. Highly toxic to bees exposed to direct treatment or to residues on crops.

Storage

Store in a cool, dry place and avoid cross contamination with other pesticides, fertilizers, food and feed.



Danger Poison

Dibrom

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container Size
Dibrom 500E (PCP # 7442)	United Agri-Products	Naled : 864 g/L	Emulsifiable concentrate	2 x 9.46 L

Crops, Insects Controlled and Rates

Crops	Insects controlled	Rates per acre	Remarks
Alfalfa, clover, vetch	Aphids, leafhoppers, lygus bug	445- 890 mL	
Beans (dry or field) peas (processing)	Alfalfa looper, aphids, red spider mites	445 - 890 mL	Ground and aerial application. Workers using the maximum rate of 890 mL/ac must limit the area treated to 200 ha per day.
Potato	Colorado potato beetle, leafhoppers, flea beetles	445 mL	Ground and aerial applications.
Sugarbeet	Red spider mites, leafhoppers	890 mL	Ground spray application only. Do not apply to food or forage crops within 5 days of harvest or grazing.
Rangeland, field areas and pastures	Grasshoppers – nymphs	222 - 344 mL	Ground and aerial application. Animals may be present during treatment.
	Grasshopper – adults	283 - 404 mL	

Note: Grasshoppers – add sufficient water to provide thorough coverage. Effect of Dibrom may be observed within a few hours. If grasshoppers move in from surrounding areas, repeat treatment as required. Animals may be present during treatment.

Application Information

How to Apply: Apply by ground equipment or by air with the exception of sugarbeets, which require ground application only.

Water Volume: Ground equipment: 100 - 300 L/acre. Air: 11 - 22 L/acre.

Application Tips

Thorough coverage required. Do not apply when temperature is over 32°C.

How it Works

Works through contact action.

Restrictions

Grazing: Do not apply to food or forage crops within 4 days of harvest or grazing, unless otherwise specified.

Re-entry: Do not allow worker entry into treated areas (outdoor or indoor) for 48 hours following application. If animals must be handled within 48 hours of application, wear chemical resistant gloves.

Environmental Precautions

This product is toxic to fish, birds and other wildlife. Keep out of any body of water. Do not contaminate water when disposing of equipment washwaters or wastes.

Dibrom (cont'd)**Toxicity**

High acute mammalian toxicity. Acute oral LD_{50} (rats) = > 50 mg/kg > 500 mg/kg. Acute dermal LD_{50} (rabbits) = 4,037 mg/kg (female/male). Toxic to bees; avoid application during periods of bee activity.

Storage

Do not use or store near heat or open flame.



Caution Poison

Eco Bran**Group 1A****Formulation**

Product	Company	Active ingredient	Formulation	Container Size
Eco Bran (PCP # 25185)	Peacock Industries	Carbaryl: 2%	Granules (2%)	20 kg bag

Crops, Insect Controlled and Rates

Crops	Insects controlled	Rate*	Remarks
Wheat, oats, rye	Grasshopper	20 - 40 g/100 m ²	Apply when pest emergence is at its peak and populations are above the economic threshold. The higher rate should be used for older grasshoppers or severe infestations.
Barley			
Corn (field and sweet)			
Canola			
Beans			
Alfalfa, clover			
Field borders, headlands, rights-of-way, roadsides, wastelands			

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air. Broadcast applications may be made with spreaders, hand applicators or by hand.

Application Tips

Timing is essential for effective control.

How it Works

A carbamate insecticide that works by ingestion. Moderate to rapid in speed of action with moderate to long residual effectiveness (2 days to 4 weeks) depending on crop/pest complex, formulation and climatic conditions.

Restrictions

Rainfall: Do not apply just before rain.

Grazing: May be used in pastures while beef cattle are grazing.

Pre-harvest Interval (days): Barley (28); canola (treat only seedling), beans (5), oats, rye, wheat (14), field corn, sweet (1), alfalfa, clovers (2), forage crops (2), field borders, headlands, rights-of-way; roadsides, wasteland (0).

Livestock re-entry period to pasture or rangeland (days): Beef cattle or other livestock (1), dairy cattle (2).

Environmental Precautions

Do not allow product to contaminate feed troughs or drinking water. Do not apply within 50 metres of sloughs, ponds, streams, dugouts or open water. Apply when winds are between 3 - 8 km/h and do not favor drift.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 540 mg/kg. Toxic to bees.

Storage

Store apart from food and feeds.



Danger Poison

Furadan

Group 1A

Formulation

Product	Company	Active ingredient	Formulation	Container size
Furadan (PCP # 10828)	Bayer Crop Science	Carbofuran: 480 g/L	Flowable	4 X 4 L pack

Crops, Insects Controlled and Rates

Crops	Insects controlled	Rates per acre	Specific remarks
Canola	Flea beetle, red turnip beetle	60 - 111 mL	Apply about two weeks after seeding or when insects are noticed. Use a minimum of 40 L of water per acre.
Mustard			
Corn (sweet, field, silage)	European corn borer	445 mL	European corn borer: Spray no later than when first feeding is seen on foliage. For second brood borers in late plantings, apply before tassels show. Corn rootworms: Spray when rootworm adults are feeding on silks prior to corn pollination.
	Western and northern corn rootworm adults	223 - 445 mL	
Potatoes	Colorado potato beetle, potato flea beetle	223 - 445 mL	Apply as soon as insects reach threshold level. Use a minimum of 324 - 410 L of water per acre. Do not apply by air.
	Potato leafhopper, tarnished plant bug	445 mL	
Sugar beet	Sugar beet root maggot	950 mL	Apply in 80 L/ac of water as drench over the row at a very early stage of root maggot activity, usually the first week of June. Application must be followed by a light sprinkler irrigation to incorporate Furadan into the soil.
Sunflower	Sunflower beetle	111 mL	Apply when these insects are first noticed. Use a minimum of 40 L of water per acre. Do not apply by air.

Application Information

Apply with ground sprayers or by aircraft.

Water volume: Ground: 40 L/ac minimum. Air: 8 L/ac minimum.

Application Tips

Check fields shortly after emergence. Do not make aerial or ground applications during temperature inversions. Drift potential is high during temperature inversions. Avoid spraying during conditions of low humidity and/or high temperature.

How it Works

Carbofuran is a broad-spectrum, carbamate insecticide, acaricide and nematicide.

Restrictions

Grazing: Sugar beet tops and pulp may be fed to beef and dairy cattle without causing residues in meat or milk.

Furadan (cont'd)

Pre-harvest Interval (days): Canola (60), corn (7), mustard (21), potatoes (7), sunflower (60).

Re-entry: Do not re-enter fields less than 48 hours following application, unless appropriate protective clothing is worn (i.e. long-sleeved shirt and long pants).

Environmental Precautions

Do not apply or allow to drift to areas occupied by unprotected human or beneficial animals. Do not contaminate feed or foodstuffs. Keep out of areas inhabited by fish, birds and wildlife.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical 11 mg/kg. Formulated product = 38 mg/kg. Highly toxic to bees, waterfowl, birds, fish and other wildlife.

Storage

Do not store below 2°C.



Danger Poison

Imidan 50 WP Instapak

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Imidan 50 WP (PCP # 23006)	Gowan Company	Phosmet : 50 %	Wettable powder	2 x 1 kg

Crops, Insect Controlled and Rates

Crops	Insects controlled	Rate per acre	Specific remarks
Alfalfa	Alfalfa weevil, alfalfa blotch leafminer	910 g	Do not apply during bloom. Do not apply more than once per cutting or within 7 days of harvest. Do not make more than 3 applications per season.
Potatoes	Colorado potato beetle, potato flea beetle, potato leafhopper, potato aphid	910 g	Do not apply within 7 days of harvest. Maximum of 5 applications per season.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Application Tips

Imidan is packaged in water-soluble sachets that are to be dropped into the spray tank unopened. Do not use in low-volume, gear-type spray equipment. Do not apply during periods of dead calm. Avoid application of this product when winds are gusty.

How it Works

Phosmet is a non-systemic, contact, organophosphorous insecticide.

Restrictions

Re-entry Interval: 5 days.

Environmental Precautions

Imidan is toxic to birds, small wild mammals and aquatic organisms. Do not apply within 15 metres of sloughs, ponds, streams, dugouts or open water.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity

Acute oral LD₅₀ (rats) = 285 mg/kg. Toxic to bees.

Storage

Store above 0°C. Keep water soluble sachets in their protective container and store in a cool, dry place. Do not store at temperatures above 40°C.



Danger Poison

Lannate

Group 1A

Formulation

Product	Company	Active ingredient	Formulation	Container size
Lannate (PCP # 10868)	E.I. Du Pont Canada	Methomyl	Soluble powder	24 x 225 g water soluble pouches

Crops, Insects Controlled and Rates

Crops	Insects controlled	Rates (acre)	Remarks
Canola	Alfalfa looper, Bertha armyworm, beet webworm, clover cutworm, cabbage looper	87 - 207 g	Aerial and ground applications.
Flax	Bertha armyworm	89 - 109 g	Aerial and ground applications.
Peas	Alfalfa looper, pea aphids	200 g	Ground applications only.
Potatoes	Leafhoppers, flea beetles, aphids	215 g	Ground applications only.
	Variegated cutworm	109 - 218 g	
Beans (snap)	European corn borer	223 g	Ground applications only.
Corn (sweet)	Aphids, corn earworm	175 - 250 g	Ground applications. Corn earworm: Apply 4 sprays at 2-4 day intervals, beginning when 25% of the ears show silk. European corn borer: Apply at 5-day intervals when egg masses begin to hatch, but no later than when the first feeding damage is seen on leaves.
	European corn borer	253 g	
Wheat, oats, barley	Common armyworms	109 - 218 g	Air and ground applications.
	Thrips	121 g	

Application Information

How to Apply: Apply with ground equipment or by air.

Water volume: Ground: 40 - 140 L/ac. Air: 9 L/ac minimum.

Application Tips

Apply when insects are causing economic damage; continue applications at 5 - 7 days intervals or as needed. Apply the low rates on small plants, small insects and light infestations of insects. Use 1 to 3 applications of the highest recommended rate for controlling severe infestations. Early morning or late evening applications times are recommended.

Lannate (cont'd)**How it Works**

A carbamate insecticide that works by contact and ingestion and has some systemic action. Rapidly degraded in green, growing plants; short-term residual.

Restrictions

Pre-harvest Interval (days): barley, oats, wheat (20); canola, flax (8); peas (1); potatoes, sweet corn (3); snap beans (7).

Environmental Precautions

This product is toxic to fish, birds and other wildlife. Keep out of any body of water. Do not apply where runoff is likely to occur. Do not apply when weather conditions favour drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical 17 - 24 m/kg. Toxic to bees.

Storage

Store product in original container only. Store away from other pesticides, fertilizer, food or feed. Not for use or storage in or around home. Do not allow product to freeze.

Lorsban/Pyrinex/Nufos/ Citadel



Danger Poison

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Lorsban 4 E (PCP # 14879)	Dow AgroSciences	Chlorpyrifos: 480 g/L	Emulsifiable concentrate	10 L, 115 L, 208 L drum
Nufos 4 E (PCP # 25831)	Cheminova Canada		Emulsifiable concentrate	10 L, 115 L, 208 L drum
Pyrinex 480 EC (PCP # 23705)	MANA Canada		Emulsifiable concentrate	10 L, 208 L drum
Citadel 480 EC	IPCO		Emulsifiable concentrate	10L

Crops, Insects Controlled and Rates

Crops	Stage	Insects controlled	Rates (mL/acre)
Barley, oats, wheat	Seedlings	Armyworm (including Bertha armyworm), army cutworm, darksided cutworm, pale western cutworm, redbacked cutworm	355 - 485
		Brown wheat mite	250
		Grasshoppers – nymphs	235
		Grasshoppers – adults	355
		Russian wheat aphids	202
Wheat	Foliage	Orange blossom wheat midge	335 - 405
Canola	Seedling	Army cutworm, darksided cutworm, pale western cutworm, redbacked cutworm, variegated cutworm	355 - 485

Crops	Stage	Insects controlled	Rates (mL/acre)
Canola	Foliage	Alfalfa looper, armyworm, Bertha armyworm	305 - 405
		Diamondback moth (larvae)	405 - 607
		Lygus bugs	202 - 405
		Grasshoppers	235 - 355
Field corn, sweet corn	Seedling: 2- 5 leaf	Black cutworm, dark-sided cutworm, red-back cutworm	485 - 970
	Soil: Pre-plant	Black cutworm, dark-sided cutworm, red-back cutworm	970
Flax	Soil or foliage	Army cutworm, darksided cutworm, pale western cutworm, redbacked cutworm, variegated cutworm	355 - 485
		Bertha armyworm	305 - 405
Sunflower	Soil or foliage	Army cutworm, pale western cutworm, redbacked cutworm	485
Lentils (Lorsban/ Citadel/Nufos only)		Pale western cutworm	354 - 485
		Grasshoppers	234 - 485
Potato	Soil or seedling	Colorado potato beetle (larvae), potato flea beetle , tarnished plant bug	404
		Black cutworm, darksided cutworm, redback cutworm	Soil: 970 Seedling: 485 - 970
Sugar beet	Soil or seedling	Pale western cutworm, redbacked cutworm	485 - 970

Registered Tank Mixes

Citadel, Lorsban, Nufos and Pyrinex may be tank mixed with 2,4-D amine and ester, Avenge, Banvel II + 2,4-D amine, Buctril M, MCPA amine and ester. Logic M can be tank mixed only with Citadel.

Caution: When tank mixing, always add the herbicide to the spray tank first and then add Citadel, Lorsban, Nufos or Pyrinex.

Application Information

How to Apply: With ground equipment or by air (unless otherwise specified on the label).

Water Volume: Ground Applications: 20 - 80 L/acre. Aerial Applications: A minimum volume of 4 - 12 L/acre.

Application Tips

Uniform coverage of crop is essential: use a boom configuration that provides optimum coverage. Use higher rates when infestations are heavy and when foliage is dense.

Bertha armyworm, and armyworm: Use higher rate for large larvae and when canopy is dense.

Cutworms: Higher rates and water volumes when the top 1 cm of soil surface is extremely dry or when the infestation is heavy.

Foliage treatments: When spraying crops near maturity, an application system that gives maximum penetration of the crop canopy is necessary to get good insect kill. Do not apply to crops in bloom. Best results will be obtained when application is made during early evening. Avoid application under hot temperatures. Do not apply to plants under extreme drought stress.

How it Works

Chlorpyrifos is a broad-spectrum, nonsystemic and contact organophosphate insecticide and acaricide.

Expected Results

Insects must come in direct contact with the insecticide to be affected. Degrades on foliage by weathering, and a significant kill of insects eating treated foliage may not last beyond 48 hours after treatment. Somewhat more persistent in soil; control of soil-dwelling insects may be more durable.

Restrictions

Rainfall: Foliar treatments: should be made 4 - 6 hours before forecast rainfall. Soil treatment: should not be applied if heavy rainfall is forecast.

Lorsban/Pyrinex/Nufos/Citadel (cont'd)

Grazing: Cereals grown for cover crop treated with chlorpyrifos insecticide should not be harvested for human or animal consumption if treated within 60 days of harvest.

Pre-harvest interval (days): Barley, oats, wheat (60), canola (21), corn – field and sweet only (70), flax (21), lentils (21 days for applications up to 354 mL/acre), (60 days for applications greater than 354 mL/acre), potatoes (7), sugarbeets (90), sunflowers (42).

Re-entry: Do not enter treated field for at least 24 hours after application.

Re-cropping: No information is specified on the label.

Maximum Allowable Applications: Barley, oats, wheat - do not apply more than 2 times per season or more than a total of 1 L/acre. See label for restrictions on other crops.

Environmental Precautions

Chlorpyrifos is toxic to birds and wildlife and extremely toxic to fish and aquatic organisms. Do not apply directly to water. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites.

Runoff: To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Leaching: Binds to organic matter in soil and is not likely to leach in soils with some organic matter.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) formulation = 440 - 900 mg/kg. Toxic to bees exposed to direct applications, drift, or residue on blooming plants.

Storage

Combustible liquid. Keep away from heat, sparks and open flame. Do not store above 38°C for extended periods of time.



Caution Poison

Malathion

Group 1B**Formulation**

Product	Company	Active ingredient	Formulation	Container size
Malathion 500 E (PCP # 4709)	United Agri-Products	Malathion: 500 g/L	Emulsifiable concentrate	2 x 10 L jug
Malathion 500 E (PCP # 5821)	IPCO			2 x 10 L jug
Malathion 85 E (PCP # 8372)	United Agri-Products	Malathion: 85 %		10 L jug
Malathion grain protector dust (PCP # 15896)	United Agri-Products	Malathion: 2 %	Dust	20 kg bag
Malathion grain protector dust (PCP # 17222)	IPCO	Malathion: 2%	Dust	20 kg bag

Crops, Insect Controlled and Rates

Crops	Insects controlled	Rates per acre	
		Malathion 500	Malathion 85 E
Alfalfa	Alfalfa weevil larvae, aphids, grasshoppers, leafhoppers, lygus bugs, spider mites, spittlebugs (adult)	0.91 - 1.1 L	0.45 - 0.54 L
	Alfalfa blotch leafminer	1.1 L	0.54 L
Flax	Grasshoppers	0.45 - 0.71 L	0.22 - 0.34 L

Crops	Insects controlled	Rates per acre	
		Malathion 500	Malathion 85 E
Barley, oats, rye, wheat	Armyworms, English grain aphids, grasshoppers, greenbugs, winter grain mites	0.44 - 1.01 L	0.45 - 0.54 L
	Cereal leaf beetle	0.89 L	
Beans	Aphids, leafhoppers, Mexican bean beetle, spider mites	0.61 - 1.11 L	0.3 - 0.44 L
Canary grass (seed production)	Aphids	0.56 L	0.27 L
Canola, mustard	Flea beetles, grasshoppers	0.45 - 0.71 L	0.22 - 0.34 L
	Diamondback moth (larvae)	0.22 - 0.34 L	0.11 - 0.17 L
Clover (500 E only)	Aphids, grasshoppers, leafhoppers, spider mites, spittle bug		0.45 - 0.54 L
Clover (sweet)	Sweet clover weevil	0.61 - 1.01 L	0.44 - 0.54 L
Corn (grain/forage)	Earworms, European corn borers	0.91 - 1.1 L	0.45 - 0.54 L
Lentils	Grasshopper	0.71 L	0.34 L
Peas	Pea aphid, leafhoppers, pea weevil, spider mites	0.91 L	0.44 L
Pasture	Grasshopper	0.41 - 1.1 L	0.11 - 0.35 L
Potatoes	Aphids, leafhoppers, Colorado potato beetles, spider mites	0.61 - 0.91 L	0.3 - 0.44 L
Sugar beet	Flea beetle	0.45 L	0.22 L

Note: Use lower rate for immature insects, light infestations or sparse foliage.

When to Apply

Foliar spray

Legumes: When economic thresholds are reached. Do not apply to legumes in bloom.

Sweet clover: Spray field margins of first-year clover in late summer or early fall when migration of weevil adults is occurring.

Canola, flax: When bees are absent from field and temperatures is above 18°C.

Sugar beets: At 3 - 5 leaf stage when insects or damage first appears.

Stored grain treatments

To be used only for stored cereal grains and corn. As grain is being loaded or turned into final storage. Surface protectant - immediately after grain is loaded into storage.

Storage protectant: Prior to filling of grain storage structures.

Crop	Insects controlled	Liquid g/1,000 kg grain	2.0% Dusts g/1,000 kg grain
Barley	Confused flour beetle, flat grain beetle, grain mites, granary weevil, Indian meal moth, lesser grain borers, red flour beetle, rice weevil, rusty grain beetle, saw-toothed grain beetle	12 g	520 g
Corn		10 g	-
Oats		17 g	735 g
Rye		10 g	450 g
Wheat		10 g	415 g
Barley, corn, oats, rye, wheat	Indian meal moth	300 mL/100m ² of grain surface	-

Note: The Canadian Grain Commission does not recommend the use of grain protectants. Malathion is more effective in dry grain than in tough or damp grain because the pesticide breaks down rapidly.

Application Information

Foliar treatments: (Malathion 500E and 85 E): Apply with ground equipment or by air.

Water volume: Potato pests: 400 L/ac.

Malathion (cont'd)

Stored grain treatments: Apply with sprayer or dust applicators. Water volume: 10 - 20 L water; Indian meal moth (surface treatment) 5 - 10 L water.

Incorporation: Add to grain as it is being augered, or scatter proper amount of dust on each load and cut in with shovel before dumping.

Application Tips

All crops: Apply when day temperature is expected to exceed 20°C. Do not apply to plants in bloom. Stored grain: To protect from Indian meal moth, spray evenly over the surface of uninfested grain and rake to a depth of 15 cm. Where special application equipment is not available, any type of low pressure sprayer holding 5 L or more can be used. Apply spray to the grain stream as it is being elevated into storage.

Before storing new grain: Thoroughly clean up old grain and debris from bins, elevators or grain handling equipment. Remove and burn all sweepings. After cleaning the premises, apply a residual malathion spray to walls, floors and machinery in grain elevators or farm storage. Force spray into cracks and crevices. Apply 5 L of spray/100 m² of surface area using a coarse wetting spray. Wait until spray has thoroughly dried before storing grain in treated areas. Spray this mixture around the outside of bins and elevators to help prevent the insects from entering the bins.

How it Works

A non-systemic, contact, organophosphate insecticide and acaricide of brief to moderate persistence. Generally non-phytotoxic.

Restrictions

Grazing: For pasture and range grass, repeat as necessary. Do not apply to fields occupied by dairy animals, but may be grazed or harvested on the day of application.

Pre-harvest Interval: Field crop and pasture: Do not apply within 7 days of harvest.

Stored grain sales: Do not apply within 7 days of selling grain. Do not apply to barley destined for malting, canola, flax or pulses.

Environmental Precautions

Malathion is highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment.

Storage

This product is flammable. Do not store near food or feed. Keep container tightly sealed when not being used.

Matador 120EC/ Silencer 120EC



Danger Poison

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Matador 120 EC (PCP # 24984)	Syngenta	Lambda-cyhalothrin: 120 g/L	Emulsifiable concentrate	4 x 3.78 L
Silencer 120 EC (PCP # 29052)	MANA Canada			4 x 3.78 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Remarks
Alfalfa ¹	Alfalfa weevil, lygus bug, pea aphid, potato leafhopper, tarnished plant bug	34 mL (ground or air)	Do not apply within 3 days of livestock foraging. Do not use more than 3 applications per year. Allow 7 days interval between treatments. Aerial Application: Do not make more than 1 application of 34 mL/ac of the allowed seasonal total by air. Pre-harvest interval: 3 days; Maximum number of application per season: 3.
Alfalfa ¹ , unimproved pasture, summer-fallow	Grasshoppers	25 - 34 mL (ground) 34 mL (air)	
Barley, oats, wheat	Grasshoppers	25 - 34 mL (ground) 34 mL (air)	Do not apply within 14 days of livestock foraging. Pre-harvest interval: 3 days. Maximum number of aerial applications: 2.
Barley, oats, wheat	Armyworm	34 mL (ground or air)	Spray no later than when first feeding damage is seen on foliage. Do not use more than 3 applications per year. Do not apply within 14 days of livestock foraging. Pre-harvest interval: 28 days.
Canola and mustard	Bertha armyworm, cabbage seedpod weevil, crucifer flea beetle, diamondback moth larvae, lygus bug	34 mL (ground or air)	Do not apply within 7 days of harvest. Do not use more than 3 applications per year. Allow a 7 day interval between treatments. Aerial application: Do not make more than 1 application of 34 mL/ac of the allowed seasonal total by air. For cabbage seedpod weevil, make only 1 application per season by either ground or aerial application equipment.
	Grasshoppers	25 - 34 mL (ground) 34 mL (air)	
Corn (field, sweet)	Armyworm	34 mL (ground or air)	Sweet Corn: Do not apply within 1 day of harvest. Corn for silage: Do not apply within 14 days of harvest. Field corn, popcorn and corn grown for seed: Do not apply within 21 days of harvest.
Corn (field, silage, sweet)	Corn earworm, European corn borer	76 mL (ground or air)	
Flax	Grasshoppers	25 - 34 mL (ground or air) 34 (air)	Do not apply within 7 days of harvest. Do not use more than 3 applications per year. Allow a 7 day interval between treatments. Aerial Application: Do not make more than 1 application of 34 mL/ac of the allowed seasonal total by air.
Lentils	Aphids	34 - 90 mL (ground or air)	Do not graze or harvest treated forage, straw or hay for livestock feed. Pre-harvest interval for dry beans and dry peas: 21 days. Pre-harvest interval: 7 days for edible podded beans. Do not use more than 3 applications per season.
	Cutworms, grasshoppers, lygus bug, potato leafhoppers	34 mL (ground or air)	
Peas (dry, succulent) faba beans (broad beans), chickpeas	Aphids	34 - 90 mL (ground or air)	Aerial application: Do not make more than 2 applications of 34 mL/ac of the allowed seasonal total by air.
	Cutworms, grasshoppers, pea leaf weevil	34 mL (ground or air)	
	Bean leaf beetle	34 - 94 mL (ground) 34 mL (air)	
Potatoes	Potato flea beetle, potato leafhopper, tarnished plant bug, tuber flea beetle	34 - 51 mL (ground or air)	The maximum rate per season must not exceed 101 mL of product per acre. Do not apply within 7 days of harvest. Do not use more than 3 applications per year if using the 34 mL per acre rate. Do not use more than 2 applications per year if using the 51 mL/acre rate. Aerial Application: Do not make more than 1 application of 34 L/ac of the allowed seasonal total by air. Pre-harvest interval: 7 days.
	Colorado potato beetle	34 - 51 mL (ground) 34 mL (air)	

¹ Alfalfa seed from treated crops is not to be used for production of 'alfalfa sprouts' for human consumption.

Matador 120EC/Silencer 120EC (cont'd)

Crop	Insects controlled	Rate per acre	Remarks
Sunflower	Sunflower beetle	17 - 26 mL (ground)	Pre-harvest interval: 7 days. Do not make more than 3 applications per season. Aerial Application: Do not make more than 1 application of 34 L/ac of the allowed seasonal total by air.
		34 mL (air)	
	Lygus bug	34 mL (ground or air)	
Timothy (hay or seed)	Grasshoppers	25 - 34 mL (ground)	Do not apply within 14 days of harvest. Treated crops may be fed to non-lactating dairy animals and other livestock following a 14 day interval from application to harvest or foraging. Do not apply by air.

Registered Tank Mixes

Matador: Achieve Liquid, Horizon, Quadris, Quilt, Tilt.

Silencer: Achieve Liquid, Bison 400, Bumper, Headline, Horizon.

When Used

Aphids: Use the higher rate when conditions favour rapidly increasing aphid populations. Repeat sprays at 7 day intervals depending on the presence of significant populations as determined by local monitoring.

Cabbage seedpod weevil: Apply at the bud to early flowering stage of crop development. Timing of applications should also be based on the presence of significant populations of adults, as determined by local monitoring. Application prior to adult migration into the field will not be effective.

Colorado potato beetle: Apply when insects or damage appears. Use the high rate once larvae are past the second instar. Timing of applications should be based on the presence of vulnerable pest developmental stages and significant populations as determined by local monitoring. Colorado potato beetle susceptibility to pyrethroid insecticides should be confirmed using an appropriate assay.

Crucifer flea beetle: To prevent migration of overwintering flea beetle adults throughout the field, ground spray a 15 m strip around the field at the first sign of flea beetle feeding.

Cutworm: Applications should be made under moist conditions in the evening or night when cutworm activity is highest. Do not disturb the soil surface for 5 days after treatment.

Grasshoppers: Best results on young, non-flying grasshoppers (up to 3rd nymphal stage, up to 1 cm in length) or when insect numbers are low. Use higher rate when grasshopper are larger, up to but not including winged adults (up to 2.5 cm in length) or when insect numbers are high. If insect migration into a field is severe, apply spray to a 15 m strip around the field.

Application Information

How to Apply: May be applied by air and ground. See above table for details.

Water Volume: Ground: 40 - 80 L/ac. Use sufficient water for thorough coverage. Air: 4 - 16 L/ac.

Application Tips

Control of some insects species with synthetic pyrethroid insecticides decreases as temperature rises. For best results, apply Matador 120EC or Silencer 120EC during early morning before temperature rise and during the evening, past the heat of the day. Temperature must be warm enough for insects to be active.

How it Works

Cyhalothrin-lambda is a photostable, synthetic pyrethroid insecticide. It is a fast acting stomach and contact insecticide. It has no fumigant or systemic activity. Best results will be obtained with Matador 120 EC or Silencer 120 EC when applied during early developmental stages of pests as determined by regular monitoring.

Restrictions

Rainfall: Avoid application when heavy rain is forecast.

Grazing: Do not graze or feed livestock treated forage or cut green crop for hay or silage.

Pre-harvest Intervals: See above table.

Re-entry: Do not re-enter treated areas until 24 hours after treatment. If early re-entry into treated areas is required, workers must wear long pants, long-sleeved shirts, chemical resistant gloves, boots and a hat.

Environmental Precautions

Toxic to aquatic organisms and fish. Do not apply within 15 m of environmentally sensitive areas using ground equipment and 100 m of environmentally sensitive areas when applying by air.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (female rats) Matador 120/Silencer 120 = 278 mg/kg; technical = 56 mg/kg. Skin and eye irritant. Toxic to bees.

Storage

Store in a cool, well ventilated area away from food or feed and out of the reach of children and animals. Store above 0°C. Storage below 0°C will not impair the effectiveness of Matador 120 EC or Silencer 120 EC; however, following such storage, agitate well before use.



Caution Poison

Monitor

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Monitor (PCP # 12287)	Bayer CropScience	Methamidophos: 480 g/L	Liquid	10 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Remarks
Canola/rapeseed	Bertha armyworm	233 - 500 mL	Applications should begin when small larvae are present or when damage first appears. Two applications may be made. Do not apply within 10 days of harvest.
	Grasshopper	505 mL	Applications should begin when migration of grasshoppers from ditches and field borders becomes apparent. Two applications may be made.
Potatoes	Aphids, Colorado potato beetle, potato flea beetle, potato leafhopper	707 - 910 mL	Apply in a 10 to 14 day program or as necessary. Do not apply later than 14 days before harvest.

Application Information

How to Apply: Apply with ground equipment or by air.

Water Volume: Ground: 80 - 400 L/ac. Air (canola): 4 L/ac minimum.

Application Tips

Avoid use during flowering and pollination periods.

How it Works

Methamidophos is a broad spectrum, organophosphorus insecticide and acaricide that works by contact and systemic action. Non-phytotoxic when used as directed. Contact effectiveness may persist for 7 - 21 days.

Restrictions

Re-entry: Do not re-enter treated fields until drifting insecticide and volatile residues have dissipated.

Monitor (cont'd)**Environmental Precautions**

This product is toxic to fish and wildlife. Do not apply to any body of water. Fish will be killed if their waters are contaminated with this product. Wildlife in contact with treated areas may be harmed.

Drift: Do not apply under conditions involving possible drift to food, forage or other plantings that might be damaged.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = 13 - 15 mg/kg, Highly toxic to bees.

Storage

Store and display apart from food or feed. Do not store in or around the home. Store in a cool, dry place but not below -10°C. Protect from heat.



Caution Poison

Movento 240 SC

Group 23

Formulation

Product	Company	Active ingredient	Formulation	Container size
Movento 240 SC (PCP# 28953)	Bayer CropScience	Spirotetramat: 240 g/L	Suspension concentrate	1 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Remarks
Potato	Aphids	89 - 148 mL	Apply when insect populations begin to build and before a damaging population becomes established. Maximum application per crop season: 295 mL. Minimum interval between applications: 7 days. Do not apply later than 7 days before harvest.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water Volume: Minimum of 120 L/acre.

Application Tips

Rate selected for use depends on aphid infestation level. Apply in adequate water for uniform coverage. For high insect pressure a follow-up application may be necessary 1 - 2 weeks after initial application.

How it Works

Movento 240 SC is fully systemic, moving through phloem and xylem to all plant tissues including new shoot, leaf and root growth. Movento 240 SC is active primarily during the ingestion by immature insect life stages.

Restrictions

Re-cropping: Plant-back interval: A plant-back restriction of 30 days is required for all crops not on the label.

Re-entry: Do not enter or allow worker entry into treated areas during the restricted entry interval of 12 hours.

Environmental Precautions

This product is toxic to aquatic organisms. Do not apply to any body of water.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay. Avoid application when heavy rain is forecast.

Drift: Movento is toxic to non-target terrestrial plants. Maintain a buffer zone of 1 metre between the point of direct application and the closest downwind edge of sensitive terrestrial habitats.

Toxicity

Acute oral LD₅₀ (female rats) = > 2,000 mg/kg. Acute dermal LD₅₀ (male/female combined rats) = > 4,000 mg/kg. Toxic to bees.

Storage

To prevent contamination, store this product away from food or feed. Do not allow product or containers to freeze. Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

Orthene

Caution Poison

Group 1B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Orthene (PCP # 14225)	Arysta LifeScience	Acephate: 75%	Soluble Powder	12 x 1.5 kg

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Remarks
Corn (seed, sweet)	European corn borer	300 - 440 g	Apply when egg mass count indicates an economically damaging population. Use the high rate only when heavy pest infestations are present.
Potato	Green peach aphid, potato aphid, potato flea beetle, potato leafhopper, tarnished plant bug	300 - 440 g	Begin applications at first sign of insects and repeat on a 7 - 10 day schedule.

Note: If Orthene is to be used on a commodity that may be exported to the U.S. and you require information on acceptable residue levels in the U. S., visit CropLife Canada's web site at www.croplife.ca

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water Volume: Corn: 90 - 400 L/ac; Potatoes: 90 - 660 L/ac.

Application Tips

Do not apply more than 4 applications per season.

How it Works

Systemic insecticide: Stomach poison.

Restrictions

Grazing: Do not feed trimmings to livestock or allow animals to graze on treated areas. Do not feed corn fodder or forage from treated crop to livestock.

Pre-harvest Intervals: Do not apply within 21 days of harvest.

Re-entry: Do not re-enter treated corn fields for 5 days. Do not re-enter treated potato fields for at least 24 hours. See label for more details on entering treated fields.

Environmental Precautions

Orthene is toxic to aquatic organisms. Do not apply to any body of water. Orthene is also toxic to birds and mammals. Observe buffer zones as specified on the label.

Leaching: Orthene has a potential to leach through soil to groundwater. The use of this product may result in

Orthene (cont'd)

contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or where the depth to the water table is shallow.

Toxicity

Moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 605 - 1,100 mg/kg. Toxic to bees.

Storage

Store in cool, dry place. Protect from excessive heat.



Danger Poison

Phostoxin

Group 8B

Formulations

Product	Company	Active ingredient	Formulation	Container size
Phostoxin Tablets* (PCP # 15736)	Garden City Ag Supplies	Aluminum Phosphide 55%	Fumigants	1 kg
Phostoxin Pellets** (PCP # 15735)				
Phostoxin Sachet*** (PCP # 16438)				

* Tables (3 g) release 1.0 g phosphine upon decomposition.

**Pellets (0.6 g) release 0.2 g phosphine upon decomposition.

*** Sachet : (34 g) release 11.0 g phosphine upon decomposition

Note: Order directly – Gastoxin – Garden City Ag. Supplies: 1-888-320-8101; Phostoxin – Garden City Ag. Supplies: 1-888-320-8101; Gardex Chemicals Ltd.: 1-204-989-4790 (Collect).

Insects Controlled

Angoumois grain moth
bean weevil
cadelle
cigarette beetle

dermestids
dried fruit moth
flour beetles
granary weevils

Indian meal moth
khapra beetle
lesser grain borer

Mediterranean flour moth
rusty grain beetle
saw-toothed grain beetle

Rates

Crop	Tablets
Raw agricultural commodities, animal feeds and processed foods	4 - 6/m ³
Commodity temperature °C	Exposure times (days)
Over 20	3
16 - 20	4
12 - 15	5
5 - 11	10
Below 5	Do not fumigate

Note: Suggested exposures should be observed. A shortened exposure period cannot be compensated for by increased dosage.

Application Tips

General: Never fumigate alone. Never fumigate any structure occupied by human or animals or physically adjoining another structure occupied by human or animals. Personnel involved in fumigation must leave the structure within 2 hours of starting fumigation. Person supervising must be a licensed fumigator, and personnel assisting must be trained and appropriately licensed in the use of aluminum phosphide.

Fumigating grain storage units: Make sure the structure is tight enough to retain the fumigant. Seal the structure as necessary. During fumigation, leave all doors, vents, etc. open to create cross-ventilation in the structure. Tablets may

be probed into grain or fed into the grain stream as the grain is transferred from one bin to another. Probing requires a pipe 3 cm in diameter and long enough to reach within 1.5 m of the bottom of the storage unit. Probes are made in a 1.5 m horizontal grid across the grain surface. Fumigant tablets are dropped down the pipe at 15 cm intervals as the pipe is withdrawn from the grain. The objective is to distribute the tablets as evenly as possible throughout the grain mass. To achieve the proper dosage when treating a stream, apply the tablets uniformly to the grain stream based on flow rate. After application, all openings should be sealed and entries locked and placarded. After the exposure period, open doors and windows for aeration. Remove all warning placards when aeration is complete.

How it Works

Phosphine (hydrogen phosphide) is a colourless gas with a carbide-like odour and high volatility. Formulated product consists of aluminium phosphide, ammonium bicarbonate, urea and paraffin. Upon exposure to air, the ammonium bicarbonate breaks down to form ammonia (a pungent, warning gas) and carbon dioxide (a fire suppressant). Within 1 - 4 hours, depending on temperature and humidity, the product begins to decompose and release phosphine. After decomposition, there remains a grey-white dust composed almost entirely of non-poisonous aluminum hydroxide with trace amounts of undecomposed aluminum phosphide. The dust is eliminated when raw agricultural commodities are moved.

Expected results

The effectiveness of this product depends on the fumigation achieved by the release of phosphine gas. Therefore, tightness of the area to be fumigated and temperature of the commodity are essential when determining dosage rates and exposure rates. The tighter the bin and the warmer the temperature of the commodity, the lower the dosage required and vice versa.

Grazing, Cropping and Other Restrictions

Aerate finished food for 48 hours before it is offered to the consumer.

Toxicity

Hydrogen phosphide gas is very toxic to all forms of animal life, and exposure to even small amounts should be prevented. Poisoning results from ingestion or inhalation as hydrogen phosphide is not absorbed through the skin. It is also insoluble in water, fats and oils.

Precautions

Protective equipment

It will be necessary to wear a gas mask if the treated area is entered prior to aeration. It is not necessary to wear a gas mask when product is applied according to label directions. Wear gloves of cotton or other breathable material when handling the product. Only open containers in open air and with the opening pointing away from your face. Wash hands after use of the product.

Reduce gas hazards

Never let tablets come in direct contact with liquid – this contact causes the immediate release of hydrogen phosphide. Never open a container except for immediate usage. Never confine the product in small gas proof enclosures such as plastic bags. Such confinement could cause the gas concentration to reach the lower flammability level. Take precautions in areas where copper, brass or gold are present, as corrosion may occur. Never fumigate in areas containing electronic or telephone equipment, photographic film or copy paper. Remove such items or protect them from exposure to the gas. Hydrogen phosphide has great penetrating power, and gas may slowly seep through concrete block walls. Hydrogen phosphide does not layer, but expands to fill the available space.

Symptoms of poisoning

Severity depends on concentration of hydrogen phosphide involved. Mild poisoning results in fatigue, nausea, pressure or pain in the chest, ringing in the ears and uneasiness. Hydrogen phosphide is not a chronic poison, and these symptoms will readily disappear with rest and fresh air. Greater quantities of gas produce such symptoms as vomiting, stomach ache, diarrhea, disturbance in equilibrium and dyspnea (difficulty in breathing). Very high concentrations quickly cause bluish-purple skin colour, agitation, poor muscle co-ordination, sub-normal blood oxygen content, unconsciousness and death. Death can occur very quickly or be delayed several days as a result of pulmonary edema and collapse, by paralysis of the central respiratory system. In cases of severe poisoning, disturbance in liver and kidney function can also occur.

First aid

Should exposure to hydrogen phosphide be documented or suspected, remove patient from gas atmosphere to open air. Call a physician immediately. Have the patient lie down, keeping him warm and comfortable. Treat as for shock. Make no antidotal use of fats, oil, butter or milk. Do not administer atropine as it is contraindicated. Begin artificial

Phostoxin (cont'd)

respiration if breathing has ceased. When exposure to low concentrations of hydrogen phosphide has been documented or suspected, the individual involved should rest for 24 hours, and under no circumstances should he resume any work dealing with fumigation. If ingested, induce vomiting by touching the back of the throat with a blunt object.

Storage

Tablets are received in resealable flasks. As long as flasks remain intact, the storage life of the product is unlimited. Storage should be in a dry, locked, ventilated area and out of the reach of children and irresponsible persons.



Caution Poison

Pounce/Ambush/Perm-UP

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Pounce (PCP # 16688)	United Agri Products	Permethrin: 384 g/L	Emulsifiable concentrate	1 L
Ambush (PCP # 14882)	AMVAC	Permethrin: 500 g/L		12 x 1 L
Perm-UP (28877)	United Phosphorus, Inc.	Permethrin: 384g/L		1 x 12 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre		Remarks
		Pounce/ Perm-UP	Ambush	
Barley, oats, rye, wheat	Pale western cutworm	73 - 158 mL	57 - 121 mL	Apply up to the 5-leaf stage. Under dry soil conditions or where cutworms are large (2.5 - 4 cm), use higher rate of product. Applications should be made under warm, moist conditions in the evening or at night when cutworm activity is highest.
Canola, corn, flax, lentils, peas, potatoes, sugar beets, sunflowers,	Army cutworm, black cutworm, dark-sided cutworm, pale western cutworm, red-backed cutworm	73 - 158 mL	57 - 121 mL	
Potato	Colorado potato beetle, potato flea beetle, potato leafhopper, tarnished plant bug	73 - 105 mL	57 - 80 mL	Use the higher rate for heavy infestations. Repeat as necessary.
Sweet corn	European corn borer, corn earworm	111 - 152 mL	NR*	Use the higher rate when severe insect pressure is anticipated. Spray no later than when first feeding is seen on the foliage. For second brood borers in late plantings, apply before tassels show.
	Fall armyworm	73 mL	NR*	
Canola	Crucifer flea beetle	36 - 73 mL	28 - 57 mL	

* Not registered.

Application Information

How to Apply: Apply with ground equipment or by air.

Water volume: Apply sufficient water for thorough coverage of foliage. See label for details on water volume.

Application Tips

For control of corn earworm: Spray to ensure coverage of ears and silk. European corn borer control: Consult with personnel company representative for proper timing of spray. Cutworms: Do not disturb soil surface for 5 days after application.

How it Works

Works by contact and as a stomach poison on a wide range of pests. No systemic or fumigant activity.

Restrictions

Grazing: Cover crop or crop treated with permethrin should not be used as a green feed for animals.

Pre-harvest Interval: Do not apply later than 1 day before harvest.

Environmental Precautions

Pounce/Ambush/Perm-UP is moderately to highly toxic to aquatic organisms, including fish. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment. Avoid drifting of spray onto any body of water or other non-target areas. Do not apply by any ground application within 15 metres or by any aerial application within 100 metres of any body of water, especially productive fisheries or waterfowl habitats.

Toxicity

Low acute mammalian toxicity. Acute oral LD₅₀ (rats) Ambush 500 EC = 3,000 mg/kg, Pounce EC/Perm-UP = 1,030 mg/kg. Severe eye irritant. Very toxic to bees.

Storage

Keep product away from fire, open flame, electric light bulbs and other sources of heat. Minimum storage temperature for Ambush - 0°C, Pounce - 12°C.

Rimon 10 EC

Group 15

Formulation

Product	Company	Active ingredient	Formulation	Container size
Rimon (PCP# 28515)	MANA Canada	Novaluron: 10%	Emulsifiable Concentrate	2 x 10 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Specific remarks
Potatoes	Colorado potato beetle, European corn borer	166 - 332 mL	Colorado potato beetle: Application should be made when the majority of the population is at egg hatch to the second instar. Use higher application rates and spray volumes for higher pest pressure, when larvae are large or foliage canopy is tall or dense. Re-application on a 10 -14 day interval will be required to protect new growth or monitoring indicates that it is necessary. European corn borer: The first application should be made just prior to egg hatch. Scout for European corn borer to monitor egg-laying and egg hatch to determine application timing. Use higher application rates and spray volumes for higher pest pressure.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water Volume: Minimum 40 L/acre.

Application Tips

Apply recommended dosage by conventional ground sprayer equipment capable of delivering sufficient water to obtain thorough, uniform coverage of the target crop. Spray equipment boom and nozzles should be oriented in a manner to minimize boom height to optimize coverage uniformity, maximize deposition and reduce spray drift.

Rimon 10 EC (cont'd)**How it Works**

Rimon 10 EC is an insect growth regulator that must be absorbed by eggs or ingested by insect larvae to be fully effective. The primary mode of action is by disrupting cuticle formation and deposition occurring when insects change from one developmental stage to another, resulting in death at molting. Due to this mode of action, Rimon 10 EC has no effect on adult stages of insects that have completed all the successive molts through larval or nymphal stages of development.

Restrictions

Pre-harvest Interval: Do not apply within 14 days of harvest.

Environmental Precautions: Rimon 10 EC is toxic to aquatic organisms. Observe buffer zones as specified on the label.

Drift: Apply only when the potential for drift to areas of human habitation or areas of human activity is minimal.

Toxicity

Novaluron has low acute toxicity. Acute oral LD₅₀ (rat) = 5,000 mg/kg. Acute dermal (rabbit) = > 2,000 mg/kg. Toxic to bees.

Storage

To prevent contamination, store this product away from food or feed.



Warning Poison

Ripcord

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Ripcord (PCP #15738)	BASF Canada	Cypermethrin: 407g/L	Emulsifiable Concentrate	6 x 1 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Remarks
Wheat, barley, canola, headlands, roadsides, summerfallow	Grasshoppers	20 - 28 mL	Apply during early stage of insect development - up to the fourth instar (approximately 15 mm and before wing development). Use the higher rate for older insects or severe infestations. Ground application only.
Corn, sweet	European corn borer, corn earworm	71 mL	For control of corn borer, apply when egg masses begin to hatch but no later than when first feeding is seen on foliage. For second brood borers in late planting, apply before tassels show. For control of corn earworm, spray directly to ensure good coverage of ears and silks.
Canola	Bertha armyworm	Ground: 28 mL Air: 36 mL	Apply when insects or signs of insect feeding first appear. Repeat treatment as necessary.
	Flea beetle	18 mL	
Sunflower	Sunflower beetle, sunflower seed weevil	28 mL	Apply when insects or signs of insect feeding first appear. A second treatment may be required after 5 days.
Potatoes	Colorado potato beetle, flea beetles, leafhoppers	25 - 50 mL	Apply when insects or signs of insect feeding are present. Use the high rate for severe infestations.
Potatoes, wheat, barley	Cutworms	71 mL	Ripcord will only control climbing cutworms or cutworms that surface to feed.

Application Information

How to Apply: May be applied by ground equipment or by air.

Water Volume: Ground application: Corn, potatoes: 120 - 202 L/ac. Cutworms: 80 - 200 L/ac. Other crops: Minimum of 45 L/ac. Aerial Application: Canola (Bertha armyworm), corn (European corn borer), potatoes (Colorado potato beetle, flea beetles, leafhoppers and tarnished plant bug), sunflowers (sunflower beetle): 4.5 - 9.0 L/ac.

Application Tips

Ensure uniform application. To avoid streaked, uneven or overlapped application, use appropriate marking devices. For grasshopper control, avoid spraying when air temperatures are above 25°C. For cutworm control, spray under warm, moist conditions, and do not disturb the soil surface for at least 5 days.

How it Works

Ripcord is a highly active synthetic pyrethroid insecticide. It works by contact and stomach action.

Restrictions

Grazing: Do not graze the treated crops or cut for hay; there are not sufficient data to support such use.

Pre-harvest Intervals: Allow 30 days between the last treatment and harvest for wheat. Allow 45 days for barley. Allow 30 days for canola. Allow 70 days between the last treatment and harvest for sunflower. For potatoes, allow 7 days between the last treatment and harvest.

Environmental Precautions

Ripcord is highly toxic to aquatic organisms, including fish. Do not apply within 15 metres of productive fishery waters. An untreated border of 15 metres for ground applications and 100 metres for aerial applications must always be left around environmentally sensitive areas such as sloughs, streams, rivers, dugouts and wetlands.

Toxicity

Low-moderate mammalian toxicity. Acute oral LD₅₀ (rats) cypermethrin = 3,200 mg/kg, Ripcord = 542 mg/kg. Very toxic to bees and fish.

Storage

Store in a heated chemical shed.



Warning Poison

Sevin XLR Plus

Group 1 A

Formulation

Product	Company	Active ingredient	Formulation	Container size
Sevin XLR Plus (27876)	Bayer CropScience	Carbaryl: 480g/L	Liquid suspension	10 L

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre	Specific remarks
Alfalfa, clover, barley oats, rye, wheat	Blister beetles, flea beetles, leafhoppers, three-cornered alfalfa hopper	1.01 - 1.6 L	Apply when insects or their damage appear. Repeat in 7 - 14 days if necessary.
	Alfalfa caterpillar, armyworm, webworms	1.01 - 2.1 L	
	Grasshoppers	0.50 - 1.01 L	

Sevin XLR Plus (cont'd)

Crop	Insects controlled	Rate per acre	Specific remarks
Beans	Mexican bean beetle	0.5 - 0.6 L	Apply when insects or damage appear. Repeat at intervals of 7 - 10 days or as necessary.
	Flea beetle, leafhopper	1.01 L	
	Lygus bugs, stink bugs	2.1 - 2.6 L	
	Climbing cutworm	30 - 35 mL/100 m of row	Spray in 25 - 30 cm band over row.
Corn (field and sweet)	Corn earworm, northern corn rootworm (adults), European corn borer, fall armyworm	1.0 - 1.6 L	For larvae in whorls and for foliage feeders, treat the entire plant. Repeat as necessary. For insects attacking silks and ears, apply at intervals of 2 - 4 days starting when first silks appear and continuing until silks begin to dry.
	Grasshoppers	0.5 - 1.01 L	
	Cutworms (climbing)	45 mL/ 100 m of row	Spray in 25 - 30 cm band over row.
Canola, including rapeseed	Flea beetle	0.2 L	Applications may be made up to four weeks following plant emergence.
Ditchbanks, field borders, forage grasses, headlands, pasture, rangelands, rights-of-way, wastelands	Grasshopper - nymphs or sparse vegetation	0.5 - 1.0 L	
	Grasshoppers - adults or dense vegetation	1.0 - 1.4 L	
Peas	Alfalfa looper	1.9 L	Apply when insects or damage appear. Repeat at intervals of 7 - 10 days or as necessary.
Potato	Colorado potato beetle	0.50 L	Apply when insects or damage appear. Repeat at intervals of 7 - 10 days or as necessary.
	Potato flea beetle, leafhoppers	1.01 L	
	Tarnished plant bugs	2.13 - 2.60 L	

Application Information

How to Apply: May be applied by ground equipment or by air.

Water volume: Use sufficient water to obtain thorough and uniform coverage of spray. Ground: 12 L/ac minimum. Aircraft: 4 L/ac minimum.

Low volume air applications: Hot, dry conditions may cause excessive evaporation of droplets. A higher spray volume per acre may be required under hot, dry conditions and when crop canopies are particularly dense.

Application Tips

Timing and good coverage are essential for effective control. Sevin XLR applications are more resistant to wash-off when applied as a concentrated suspension. To ensure wash-off resistance, apply dilutions 1 part Sevin XLR to no greater than 39 parts water. Application should be made to dry foliage to maximize wash-off resistance.

How it Works

A carbamate insecticide that works by contact and ingestion. Moderate to rapid in speed of action with moderate to long residual effectiveness (2 days to 4 weeks) depending on crop/pest complex, formulation and climatic conditions. Some immediate control is expected, but the majority of control occurs 24 - 48 hours after application.

Restrictions

Rainfall: Do not apply just before rain.

Grazing: Forage and feed crops, including bean vines, hay, pea vines, may be grazed or harvested for use as feed for dairy animals 48 hours after treatment and meat animals 24 hours after treatment without resulting in illegal residues in milk or meat. Remove cattle from area to be sprayed. Treated forage and feed crops may be fed to dairy animals and animals for slaughter provided sprays are applied as directed. Beef cattle may be re-introduced to range 1 day after application; dairy cattle 2 days after application.

Sevin XLR Plus (cont'd)

Pre-harvest Intervals (days): Barley (28), oats, rye, wheat (14), peas (3), beans (5), corn (1), potatoes (7), alfalfa, clovers (2), forage grasses, non-crop areas, pasture, rangeland (1).

Environmental Precautions:

Do not apply when weather conditions favour runoff or drift. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Do not apply directly to water or to areas where surface water is present. Do not allow product into surface water, drains or ground water.

Drift: Do not apply or allow to drift to blooming crops or weeds if bees are visiting the treatment area.

Toxicity

Sevin XLR has a moderate acute mammalian toxicity. Acute oral LD₅₀ (rats) = 699 mg/kg. Acute dermal LD₅₀ (rats) = > 4,000 mg/kg. Highly toxic to bees.

Storage

Do not store where temperature frequently exceeds 38°C. All formulations will withstand freezing.



Danger Poison

Thimet 15 G

Group 1 B

Formulation

Product	Company	Active ingredient	Formulation	Container size
Thimet (PCP # 10532)	American Vanguard Corp	Phorate: 15%	Granules	20 and 25 kg bag

Crops, Insects Controlled and Rates

Crop	Insect controlled	Rate per 100 m row	Specific remarks
Potatoes	Wireworms	140 g in sandy or light soil 215 g in silt or heavy soils	Distribute the granules evenly in the furrow or granules may be banded on each side of the row at planting time. Do not apply later than at planting time. Do not harvest potatoes before 90 days after planting time.

Application Information

How to Apply: Apply with granular pesticide applicator.

Application Tips

Potatoes: Do not place in direct contact with the seed. Do not use in muck soils. Do not apply to any area not specified on the label.

How it Works

A systemic, organophosphorus insecticide with effective initial residual activity against soil insects and other arthropods.

Restrictions

Rainfall: Relatively insoluble in water; therefore, the effect of normal rainfall is not appreciable.

Grazing: Do not feed treated foliage within 60 days of treatment.

Re-entry: Do not enter or allow workers to enter treated areas during the restricted entry interval of 48 hours.

Environmental Precautions

This product is highly toxic to birds, small mammals, fish and aquatic invertebrates. Any spilled or exposed granules must be incorporated into the soil or otherwise cleaned up from the soil surface.

Thimet 15 G (cont'd)**Toxicity**

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = 2 - 4 mg/kg. Acute dermal LD₅₀ (rabbits) = 226 mg/kg. Poisonous by skin contact, inhalation or swallowing. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to poisoning.

Storage

Do not use or store in or around the home. Store open bags in labelled, sealed drums or heavy plastic bags.



Danger Poison

Thiodan/Thionex EC

Group 2 A

Formulation

Product	Company	Active ingredient	Formulation	Container size
Thiodan 4 EC (PCP # 15747)	Bayer CropScience	Endosulfan 400 g/L	Emulsifiable concentrate	10 L jug
Thionex EC (PCP # 23453)	United Agri Product			
Thiodan 50 WP (PCP # 15021)	Bayer Crop Science	Endosulfan 50%	Wettable Powder	1 kg bag

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per acre		Remarks
		Thionex EC	Thiodan WP	
Alfalfa, clover	Spittle bug	0.3 L		
Beans	Black bean aphid, green clover worm, Mexican bean beetle, potato leafhopper	0.6 - 1 L	0.45 - 0.6 kg	Do not apply on lima beans.
Corn (field, sweet)	Corn earworm	1.1 - 1.7		Apply to the silk.
	Corn leaf aphids	1.1 L		Apply when aphids appear. Repeat as necessary.
Potato	Aphid, Colorado potato beetle, flea beetle, leafhopper, tarnished plant bug*, tuber flea beetle	0.6 - 0.8 L	0.44 - 0.6 kg	Apply when insects first appear, repeat as necessary to maintain control.
Sugarbeet	Beet webworm, green peach aphids	0.8 - 1.1 L		
Sunflower	Sunflower beetle	0.6 L		Apply when plants are about 45 cm high.

* For tarnished plant bug control in potatoes apply at 0.8 L/acre.

Application Information

How to Apply: Apply with ground equipment only. Do not apply by air.

Water volume: Thorough wetting of all plant parts is essential for good results.

Application Tips

Apply during late evening. Spray upper and lower leaf surfaces. Prevent sprays or dusts from drifting to areas occupied by people or animals.

How it Works

A non-systemic, organochloride insecticide/acaricide with both contact and stomach action.

Restrictions

Grazing: Do not feed treated bean threshings or crop refuse to livestock. Do not feed treated sugar beet foliage to livestock; however, roots may be fed. Do not feed treated sunflower foliage to livestock.

Pre-harvest Intervals (days): Alfalfa (30), beans (2), clover (30), corn (50), peas (7), potatoes (1), sugar beets (45), sunflower (60). Do not feed alfalfa or clover forage within 30 days of application.

Re-cropping: Do not apply to crops that are to be followed by a root crop other than carrots, potatoes, sweet potatoes or sugar beets.

Environmental Precautions

Endosulfan is moderately to highly toxic to aquatic organisms, fish, birds and mammals. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application, disposal of waste or cleaning equipment. Do not apply or allow to drift to areas occupied by unprotected persons and animals, or to streams, lakes or ponds to protect wildlife.

Toxicity

High acute mammalian toxicity. Acute oral LD₅₀ (rats) = technical 80 - 110 mg/kg. Highly toxic to bees.

Storage

Store in a cool, dry location.

Titan ST



Danger Poison

Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Titan ST (PCP # 27449)	Bayer CropScience	Clothianidin: 600 g/L	Suspension	1 L, 3.8 L, 10 L, 200 L, 1000 L.

Crops, Insects Controlled and Rates

Crop	Insects controlled	Rate per 100 kg of potato seed pieces	Specific remarks
Potato seed piece treatment	Wireworm suppression.	20.8 mL	Apply specified dosage as a diluted spray onto seed pieces using a shielded spray system. Agitate or stir spray solution as needed. For optimal insect control, good coverage of the seed pieces is required. Do not dilute with any more than 6 parts water to 1 part Titan ST. Plant seed pieces as soon as possible after cutting and treating. For extended residual control of pests other than wireworm, apply the higher rate. Apply only one application per season.
	Aphid, Colorado potato beetle, potato leafhopper, potato flea beetle*	10.4 - 20.8 mL	

* Including overwintered adults and suppression of second generation

Application Information

How to Apply: Apply using appropriate seed piece treater designed for treating potatoes.

Application Tips

Apply only in areas with adequate ventilation or in areas that are equipped to remove spray mist or dust.

How it Works

Titan ST is a systemic insecticide that affects the nervous system through ingestion for suppression of wireworm damage.

Restrictions

Grazing: Do not use treated seed for food, feed or oil processing.

Titan ST (cont'd)

Re-cropping: Corn, canola and potatoes may be replanted at any time. A twelve-month interval is required for leafy, root and tuber vegetables (except potatoes). A 30-day plant-back interval is required for cereal grains, grasses, non-grass animal feeds, soybeans and dried beans.

Environmental Precautions

Titan ST is very toxic to wild birds and wild mammals when used as a seed treatment. Do not expose treated seed pieces on the soil surface. Any spilled or exposed seed pieces should be incorporated into the soil or otherwise cleaned up from the soil surface. Titan ST is also toxic to aquatic invertebrates. Do not apply directly to water or to areas where surface water is present. Do not contaminate water when disposing of equipment wash waters.

Leaching: Titan ST demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of Titan ST in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Toxicity

Acute oral LD_{50} (rats) = 2,000 mg/kg. Acute dermal LD_{50} > 4,000 mg/kg.

Storage

Store in a cool place. Do not store in direct sunlight. Protect from freezing temperatures.

Seed Treatment Index

Name	Page/s	Name	Page/s
Seed Treatment of Cereal, Forage, Oilseed and		<i>imidacloprid</i>	361
Pulse Crops	340	<i>imidacloprid + carbathin + thiram</i>	361
Purpose of seed treatment	340	<i>ipconazole</i>	369
Methods of seed treatment	340	MancoPlus PSPT	364
Seed Treatment Selector Chart	341	<i>mancozeb</i>	364
Fungicide Group Classification by		<i>maneb</i>	357
Mode of Action	346	Maxim MZ PSP	365
		Maxim PSP	365
		Mertect SC	366
Seed Treatment		<i>metalaxyl</i>	350,352
Agrox B-2	348	<i>metiram</i>	366
Agrox CD	348	Polyram 16D	366
Agrox FL	349	Poncho 600 FS	367
Allegiance	350	Potato ST 16	364
Apron FL	350	Rancona Apex	369
Apron Maxx RTA	351	Raxil MD	370
Apron XL LS	352	Raxil T	371
Armour	354	Raxil WW Seed Treatment	372
<i>captan</i>	349	Senator PSP	374
<i>carbathiin + thiabendazole</i>	355	Stress Shield	372
<i>carbathiin + thiram</i>	377	<i>tebuconazole + metalaxyl</i>	370
Charter	354	<i>tebuconazole + thiram</i>	371
Charter RTU	354	<i>thiabendazole</i>	366
<i>clothianidin</i>	367	<i>thiamethoxam + difenoconazole +</i>	
Clutch	367	<i>metalaxyl-m</i>	356
Crown	355	<i>thiamethoxam + difenoconazole +</i>	
Cruiser Maxx Cereals	356	<i>metalaxyl-m + fludioxonil</i>	363
DB-Red L	357	<i>thiophanate methyl</i>	374
DCT	358	<i>thiram</i>	374
<i>diazinon + captan</i>	348	Thiram 75WP	374
<i>diazinon + captan + thiophanate methyl</i>	358	Trilex AL	375
<i>difenoconazole + metalaxyl-M</i>	359	<i>trifloxystrobin + metalaxyl</i>	375
Dividend XL RTA	359	<i>triticonazole</i>	354
<i>fludioxonil</i>	365	<i>triticonazole + thiram</i>	362
<i>fludioxonil + mancozeb</i>	365	Tuberseal PSPT	364
<i>fludioxonil + metalaxyl-M</i>	351	VitaFlo 280	377
Gaucha CS FL	361		
Gaucha 480 FL	361		
Gemini	362		
Helix	363		
Helix Xtra	363		

Seed Treatment of Cereal, Forage, Oilseed and Pulse Crops

Purpose of seed treatment

Seed treatment provides economical insurance against many diseases and some insect pests of seed and seedlings. Chemical treatment can give seedlings a head start by preventing or reducing damage resulting from certain crop pests.

Diseases are controlled by contact fungicides that destroy fungi carried on the seed, such as common bunt of wheat, the surface-borne smuts of barley and oats, fungus stripe of barley and some leaf-spotting and seed decay fungi. Systemic fungicides destroy fungi carried in the seed, such as loose smut of wheat and barley, and they protect the early growth of the seedling.

Specific recommendations:

- Rye and flax should be treated because they are very susceptible to seed decay.
- Winter wheat should be treated to prevent bunt and seed decay as well as to promote good seedling growth.
- If bunt or smut was observed in a crop that will be used for seed, the grain should be treated. If a variety is grown that is susceptible to bunt or smut and the presence of the disease is uncertain, it may be wise to treat the seed annually or every second year, depending on the susceptibility of the variety.
- Canola should always be treated to control the seed-borne phase of blackleg.
- Alfalfa seed is treated to control verticillium wilt.

Insecticidal seed treatment will prevent or reduce damage caused by certain crop pests.

Methods of seed treatment

Custom treatment

Fungicides are applied to the seed sometime before planting. Seed cleaning plants are equipped to treat seed with liquid fungicides. Canola can only be treated by custom applicators as there are no farmer-applied seed fungicides available. Farmers can use a variety of methods for both liquid and dry formulation application.

Precautions

- **read** and **follow** label directions carefully
- **treated** seed must not be allowed to contaminate grain intended for food, feed or commercial use
- **bury** leftover treated seed or store it safely in labelled bags for future use as seed
- **treated** seed offered for sale must be labelled with the name of the treated chemicals (*Canada Seed Act*)
- **treated** seed in transit must be bagged or bulk loads tarped to prevent spillage (*Alberta Act*)

Seed Treatment Selector Chart

Cereals

Products	Apron XL LS	Charter/Charter RTU/Amour	Cruiser Maxx Cereals	DB-Red	Dividend XL RTA	Gemini	Rancona Apex	Raxil MID	Raxil T	Vitaflo 280	Raxil WW
Barley											
Diseases											
Common root rot		S	S	C	S	S	S	S	S	S	S
Seed rot		C	C		C	C	C	C	C	C	C
Seedling blight		C	C	C	C	C	C	C	C	C	C
<i>Pythium</i> damping off	C		C		C	C		C			C
<i>Fusarium</i> crown and root rot		S	S		S	S	S	S	S		S
Covered smut		C	C	C	C	C	C	C	C	C	C
False loose smut		C	C	C	C	C	C	C	C	C	C
True loose smut		C				C	C	C	C	C	C
Leaf stripe							C	C		C	C
Net blotch										S	
Seed-borne <i>Septoria</i>					C			C			C
Take all			S		S						
Insects											
Wireworms			S								S
Wheat (including Durum)											
Diseases											
Common root rot		S	S	C	S	S	S	S	S	S	S
Seed rot		C	C		C	C	C	C	C	C	C
Seedling blight		C	C	C	C	C	C	C	C	C	C
<i>Pythium</i> damping off	C		C		C	C		C			C
<i>Fusarium</i> crown and root rot		S	S		S	S	S	S	S		S
Loose smut		C	C		C	C	C	C	C	C	C
Common bunt		C	C	C	C	C	C	C	C	C	C
Seed-borne <i>Septoria</i>					C			S	C	C	S
Take all			S		S						
Insects											
Wireworms			S								S

C = Control, S = Suppression

Seed Treatment Selector Chart

Cereals cont'd

Products	Apron XL LS	Charter/Charter RTU/Amour	Cruiser Maxx Cereals	DB-Red	Dividend XL RTA	Gemini	Rancona Apex	Raxil MD	Raxil T	Vitalflo 280	Raxil WW
Oats											
Diseases											
Common root rot		S		C	S		S	S	S	S	S
Seed rot		C			C		C	C	C	C	C
Seedling blight		C		C	C		C	C	C	C	C
Pythium damping off	C							C			C
Fusarium crown and root rot		S			S		S	S			S
Loose smut		C			C	C	C	C	C	C	C
Covered smut		C		C	C	C	C	C		C	C
Seed-borne septoria											
Insects											
Wireworm											S
Rye											
Diseases											
Common root rot				C	S		S			S	
Seed rot					C		C			C	
Seedling blight				C			C			C	
Pythium damping off	C				C					C	
Fusarium crown and root rot					S		S				
Stem smut										C	
Common bunt				C	C						
Seed-borne Septoria					C						

C = Control, S = Suppression

Seed Treatment Selector Chart

Oilseed Crops

Products	Apron FL/Allegiance	Apron XL LS	Gaucho CSFL/Gaucho 480	Helix/Helix Xtra	Poncho 600 FS	Thiram	Vitalflo 280
Canola							
Diseases							
Seed and seedling rot/blight	C		C	C			
Pythium seed rot/damping off		C	C	C			
Seed-borne blackleg			C	C			
Seed-borne <i>Alternaria</i>			C	C			
Insects							
Flea beetle (early season control)			C	C	C		
Mustard							
Diseases							
Seed and seedling rot/blight			C	C		C	
Pythium seed rot/damping off			C	C		C	
Seed-borne blackleg			C				
Seed-borne <i>Alternaria</i>				C			
Insects							
Flea beetle (early season control)			C	C			
Flax							
Diseases							
Seed rot/seedling blight							C
Sunflower							
Diseases							
Seed and seedling rot/blight	C						

C = Control, S = Suppression

Corn

Products	Agrox B-2/ Agrox CD	Agrox FL	Apron XL LS	Poncho	Thiram	Vitalflo 280
Diseases						
Seed rot	C	C			C	C
Root rot		C				
Seedling blight	C	C			C	
Head smut						C
Pythium damping off		C	C		C	C
Insects						
Seed corn maggot	C			C		
Wireworm				C		
Black cutworm				C		
Corn flea beetle				C		
White grubs				C		

Forages (Grasses and Legumes - Alfalfa, bird's-foot trefoil, Clover, Vetch)

Products	Apron FL/Allegiance
Diseases	
Seed and seedling rot/blight	C

Seed Treatment Selector Chart

Pulse Crops

Products	Agrox B-2/Agrox CD	Agrox FL	Apron FL/Allegiance	Apron Maxx RTA	Apron XL LS	Crown	DCT	Thiram 75 WP	Trilex AL	Vitaflo 280
Beans										
Diseases										
Seed and seedling rot/blight	C	C		C			C	C	C	C
<i>Pythium</i> seed rot/damping off			C	C	C			C	C	C
Seed-borne <i>anthracnose</i>				C			C			
Insects										
Root maggots							C			
Seed corn maggots	C									
Wireworms										
Potato leafhopper										
Peas										
Diseases										
Seed and seedling rot/blight	C	C	C	C				C	C	C
<i>Pythium</i> seed rot/damping off				C	C			C	C	C
Seed-borne <i>ascochyta</i>				C						
Insects										
Seed corn maggots	C									
Lentils and chickpeas										
Diseases										
Seed and seedling rot/blight		C		C		C			C	C
<i>Pythium</i> seed rot/damping off		C	C	C	C				C	C
<i>Botrytis</i> seed rot and seedling blight						C				
Seed-borne <i>ascochyta</i>				C		C			S	

C = Control, S = Suppression

Seed Treatment Selector Chart

Potatoes

Products	Actara	Admire/Alias/Grapple/Grapple ₂	Maxim PSP/Maxim MZ PSP	Mertect SC	Potato ST 16/Tuberseal/Manco	Polyram 16 D	Senator PSP	Titan
Diseases								
Blackleg							C	
Black scurf			C					
Common scab						C		
<i>Fusarium</i> dry rot (storage)			C	C			C	
<i>Fusarium</i> seed piece decay					C	C	C	
Silver scurf			C				C	
<i>Verticillium</i> wilt							C	
Insects								
Colorado potato beetle	C	C						C
Potato flea beetle		C						C
Potato leafhopper	C	C						C
Aphids	C	C						C
Wireworm								S

C = Control, S = Suppression

Fungicide Group Classification by Mode of Action

Mode of action	Chemical family	Active ingredients	Found in
Group 1			
Inhibition of tubulin formation.	Benzimidazole	thiabendazole thiophanate-methyl	Crown, Mertect SC DCT*, Senator 70WP, Senator PSPT
Group 2			
Affect DNA and RNA synthesis & metabolism.	Dicarboximides	iprodione	Rovral Flo, Rovral RX
Group 3			
Demethylation inhibitors.	Triazoles (includes conazoles)	difenoconazole ipconazole propiconazole prothioconazole tebuconazole triticonazole	Dividend XL RTA, Helix*, Helix XTra* Rancona Apex Bumper 418 EC, Pivot 418 EC, Quilt, Stratego 250 EC, Tilt 250E Proline Folicur 432 F, Raxil MD, Raxil T Charter, Charter RTU, Gemini
Group 4			
Phenylamides. Affects RNA synthesis.	Acylamides	metalaxyl metalaxyl-M	Allegiance FL, Apron FL, Apron Maxx RTA, Bravo 500, Prosper*, Raxil MD, Ridomil Gold, Ridomil Gold MZ 68WP Trilex AL Dividend XL RTA, Helix*, Helix XTra*
Group 5			
Morpholines inhibition of an isomerase in sterol biosynthesis.	Morpholines	dimethomorph	Acrobat 50 WP
Group 7			
Oxathiin. Affect mitochondrial transport chain.	Anilide (oxathiin)	boscalid carbathiin	Headline Duo, Lance Crown, Gaucho 480*, Gaucho CS FL*, Prosper*, Vitaflo 280
Group 9			
	Pyrimidine	pyrimethanil	Scala
Group 11			
Strobilurin type action and resistance. Inhibit mitochondrial respiration.	Oxazole Strobilurin	famoxadone azoxystrobin fenamidone pyraclostrobin trifloxystrobin	Tanos 50 DF Quadris, Quilt Reason 500 SC Headline Duo, Headline EC Stratego 250 EC, Trilex AL
Group 12			
Phenylpyrroles.	Phenylpyrroles	fludioxonil	Apron Maxx RTA, Helix*, Helix XTra*, Maxim MZ PSP, Maxim PSP

(continued)

Fungicide Group Classification by Mode of Action

Mode of action	Chemical family	Active ingredients	Found in
Group 21			
	Imidazole	cyazofamid	Ranman
Group 22			
		zoxamide	Gavel 75 DF
Group 29			
	pyridine	fluazinum	Allegro 500F
Group 40			
	Amide Fungicide	mandipropamid	Revus
Group M			
Multi-site activity.	Chloronitrile	chlorothalonil	Bravo 500, Ridomil Gold, Tattoo C, Echo 720, Echo 90 DF
	Dithiocarbamates	mancozeb	Dithane DG 75, Gavel 75 DF, MancoPlus, Maxim MZ PSP, Manzate 200/75DF/Pro-stick, Penncozeb 75DF/80WP, Potato Seed Treatment, Ridomil Gold MZ 68WP, Tuberseal
		maneb	D-B Red L, Dithane M-22
		metiram	Polyram 16D, Polyram DF
		thiram	Gaucha 480*, Gaucha CS FL*, Gemini, Prosper*, Raxil T, Thiram 75WP, Vitaflo 280
	Inorganic	copper	Copper 53W, Copper Spray
	Phthalimide	copper hydroxide	Kocide 2000, Parasol
		captan	Agrox B-2*, Agrox CD*, Captan Flowable, DCT*
		sulfur	Kumulus DF
Group U			
Unclassified.	Acetimide	cymoxanil	Curzate 60 DF, Tanos 50 DF
	Carbamate	propamocarb-hydrochloride	Tattoo C

* Contains fungicide and insecticide combination.

Agrox B-2/Agrox CD



Caution Poison

Insecticide Group 1B Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Agrox B-2 (PCP # 26956)	Norac Concepts Inc.	Captan: 33.5% + Diazinon: 11%	Wettable Powder	2 kg
Agrox CD (PCP# 26957)		Captan: 15% + Diazinon: 15%		200 g, 600 g and 1 kg

Crops, Insects and Diseases Controlled, Rates

Crop	Insects	Diseases	Rate	
			Dry application	Slurry machine
Agrox B-2				
Corn	Seed corn maggot	Seedling blight	85 g/25 kg seed	315 mL of slurry per 25 kg of seed
		Seed rot		
Beans	Seed corn maggot	Seedling blight	80 g/25 kg seed	310 mL of slurry per 25 kg of seed
		Seed rot		
Peas	Seed corn maggot	Seedling blight		
		Seed rot		
Soybeans	Seed corn maggot	Seedling blight		
		Seed rot		
Agrox CD				
Beans	Seed corn maggot	Supplement previous fungicidal treatment for seedling blight and seed rot	50 g/25 kg seed.	—
Corn				—
Peas				—
Soybean				—

Registered Tank Mixes

Agrox B-2: None registered.

Agrox CD: Use Agrox CD only on seed previously treated with Captan or Thiram. Do not use on seed already treated with an insecticide (other than methoxychlor or malathion).

Application Information

Batch mixing: For every 25 kg of seed, mix 84 g of Agrox B-2 with 500 mL of water. Keep mixture agitated and seed treatment in suspension in the water, pour over the seed and mix with a paddle or stick until uniformly coated. Allow to dry before seeding or bagging.

Application Tips

Treat only the amount of seed to be sown.

How it Works

Agrox is an insecticide-fungicide seed treatment that contains two active ingredients, captan and diazinon. Captan is a phthalimide fungicide with multi-site contact activity. Diazinon is an organophosphate insecticide with contact and stomach activity.

Restrictions

Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Do not contaminate food, feed or any body of water.

Toxicity

Captan – **Ingestion:** Practically non-toxic. Acute oral LD₅₀ (rats) = 5,000 mg/kg. **Dermal:** Slightly toxic. Dermal LD₅₀ (rabbit) = 2,000 mg/kg.

Diazinon – **Ingestion:** Acute Oral LD₅₀ (rat) = 300 mg/kg. Dermal LD₅₀ (rat) = >2,000 mg/kg.

Storage

Store in cool, dry place away from food or feed. Keep container closed when not in use.

Agrox FL

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Agrox FL (PCP # 24684)	Norac Concepts Inc.	Captan: 30%	Flowable	20 L, 415 L, 1,000 L

Crops, Diseases Controlled and Rates

Crop	Diseases	Rate per 25 kg seed
Beans (dry)	Storage rot, seed decay, root rot, damping off, seedling blight	70 mL
Corn (field)		30* - 50 mL
Corn (sweet)		60* - 85 mL
Peas, lentil, chickpea		70 mL
Sugar beet		155 mL

* Product is to be applied at this rate only by a professional applicator using equipment that will assure complete and uniform coverage.

Registered Tank Mixes

None registered.

Application Information

Mix the recommended amount of Agrox FL with the amount of water required for the slurry treater equipment to be used. Use equipment that will ensure complete and uniform coverage. Seed treated by this method should be dried before bagging. A colourant must be added to this product to colour the seed in accordance with the *Pest Control Products Act* and the *Seeds Act* Regulations.

How it works

Agrox FL is a fungicide seed treatment that contains captan. Captan is a phthalimide fungicide with multi-site contact activity.

Restrictions

Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Agrox FL contains a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Avoid contamination of aquatic systems during application. Do not contaminate these systems through direct application,

Agrox FL (cont'd)

disposal of waste or cleaning of equipment.

Toxicity

Ingestion: Practically non-toxic. Acute oral LD₅₀ (rats) = 5,000 mg/kg. **Dermal:** Slightly toxic. Dermal LD₅₀ (rabbit) = 2,000 mg/kg.

Storage

Store in cool, dry place away from food or feed. Keep container closed when not in use.



Caution Irritant

Apron FL/Allegiance

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Apron FL (PCP # 24262)	Bayer CropScience	Metalaxyl: 317 g/L	Liquid suspension	4 X 3.79 L
Allegiance (PCP # 26674)				

Crops, Diseases Controlled and Rates

Crops	Diseases	Rate per 100 kg seed	Water	Total volume
Chickpeas, dry peas	Seed rot and seedling blight	16 - 110 mL	484 - 390 mL	500 mL
Canola, rapeseed, peas (processing)	Seed rot and seedling blight	16 - 110 mL	484 - 390 mL	500 mL
Alfalfa, bird's-foot trefoil, clover, vetch, sainfoin	Seed rot and seedling blight	46 - 110 mL	454 - 390 mL	500 mL
Grasses (forage)	Seed rot and seedling blight	46 - 93 mL	454 - 407 mL	500 mL
Sunflower	Seed rot and seedling blight, downy mildew	110 - 189 mL	390 - 311 mL	500 mL
Lentils (low tannin)**	Pythium seed rot	16 mL	484 mL	500 mL
Soybeans	Seed rots and seedling blights, early season Phytophthora	46 - 93 mL	454 - 407 mL	500 mL

* Higher rate needed for downy mildew.

** For use on low tannin lentils destined for export or seed production only.

Registered Tank Mixes

None registered.

Application Information

Mix with water to form a slurry seed treatment. A suitable seed colourant must be added to the slurry prior to application on seed. The slurry should be applied as a spray into the mixing chamber of the seed treating equipment to ensure good coverage. See instructions supplied with the applicable seed treater system for information on proper application techniques.

Crops Intended For Export

If the crop is intended for export, consult with the importer to establish what rates of Allegiance FL are used on the crop in their country for controlling specific diseases.

Application Tips

Use only the recommended rates.

How it Works

Metalaxyl is a systemic fungicide that is absorbed into the germinating seed and is transported through the growing seedling, providing control of seed and seedling diseases.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for four weeks after planting. Treated seed must not be used for food, feed or oil processing.

Environmental Precautions

Treated seed may be toxic to birds and other wildlife. Clean up any spilled seed. Ensure that treated seed is properly incorporated at planting. Do not apply this product directly to freshwater habitats, estuaries or marine habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Toxicity

Ingestion: Low toxicity. Acute oral LD₅₀ (rats) = 2,900 mg/kg. **Dermal:** Slightly toxic. Dermal LD₅₀ (rabbit) = 2,000 mg/kg.

Storage

Store product in original container away from other pesticides, fertilizer, food or feed. Do not store product in direct sunlight. Do not store Apron FL/Allegiance FL above 35°C or below 0°C.



Caution Irritant

Apron Maxx RTA

Fungicide Group 4, 12

Formulation

Product	Company	Active ingredient	Formulation	Container size
Apron Maxx RTA (PCP # 27577)	Syngenta Crop Protection	Fludioxonil: 0.73% + Metalaxyl M: 1.1%	Liquid	2 x 10 L, 55 L keg, 115 L tote

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 100 kg seed
Chickpeas	Control of seed rot, pre-emergence and post-emergence damping-off caused by <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp. and <i>Pythium</i> spp.	325 mL
	Seed rot and seedling blight caused by seed-borne <i>Botrytis</i> spp.	
	Seed-borne <i>Ascochyta</i> blight caused by <i>Ascochyta rabiei</i>	
Dry beans	Damping-off caused by <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp. and <i>Pythium</i> spp.	325 mL
	Anthrachnose caused by seed-borne <i>Colletotrichum</i> spp.	
Lentils	Control of seed rot, pre-emergence and post-emergence damping-off caused by <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp. and <i>Pythium</i> spp.	
	Seed rot and seedling blight caused by seed-borne <i>Botrytis</i> spp.	
	Seed-borne <i>Ascochyta</i> blight caused by <i>Ascochyta rabiei</i>	
Peas (field and succulent)	Control of seed rot, seedling blight, pre-emergence and post-emergence damping-off caused by <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp. and <i>Pythium</i> spp. Seed-borne aschochyta blight and foot rot caused by <i>Ascochyta pinodes</i>	

Apron Maxx RTA (cont'd)

Crops	Diseases controlled	Rate per 100 kg seed
Soybeans	Damping-off and seed rots caused by <i>Pythium</i> spp., <i>Fusarium</i> spp. and <i>Rhizoctonia</i> spp.	325 mL
	Seed rot and seedling blight caused by seed-borne <i>Phomopsis</i> spp.	
	Early season root rot caused by <i>Phytophthora megasperma</i> var. <i>sojae</i> .	
Fababeans	Control of seed rot/pre-emergence damping-off, post-emergence damping-off and seedling blight caused by <i>Fusarium</i> spp., <i>Pythium</i> spp. and <i>Rhizoctonia</i> spp.	

Registered Tank Mixes

None registered.

Application Information

Apron Maxx RTA is a ready-to-apply seed treatment for use in commercial seed treatment plants and for on-farm treatment. Apron Maxx RTA may also be used in treat-on-the-go air seeders. The equipment must provide uniform coverage of Apron Maxx RTA on the seed. Allow the seed to dry before bagging, storing or seeding.

Seed Treatment and Inoculants

Apron Maxx RTA can be used with some *Rhizobium*-based inoculants. Contact inoculant manufacturer for proper recommendations. Treated seed may not flow at the same rates through seeding equipment as untreated seed. With rough coated seed, the addition of water to Apron Maxx will increase coverage; contact Syngenta Crop Protection for more information.

How it works

Apron Maxx RTA contains two active ingredients. Fludioxonil is a phenylpyrrole fungicide with contact activity. Metalaxyl M is an acylalanine fungicide with systemic activity against certain fungal diseases.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for four weeks after planting.

Re-cropping: Do not plant any crop other than soybeans, beans, chickpeas, lentils, lupins, faba beans and peas within 30 days to fields in which treated seeds were planted.

Environmental Precautions

Apron Maxx RTA is toxic to fish and other aquatic organisms. Do not apply this product directly to aquatic habitats, estuaries or marine habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Any spilled or exposed seeds must be incorporated into the soil or cleaned up.

Toxicity

Ingestion: Low toxicity. Acute oral LD₅₀ (rats) = 5,050 mg/kg. **Dermal:** Low toxicity. **Dermal:** LD₅₀ (rabbit) = 2,020 mg/kg.

Storage

Store product in original container. Do not store Apron Maxx RTA above 30°C or below 0°C.

Apron XL LS

Fungicide Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Apron XL LS (PCP # 25585)	Syngenta Crop Protection	Metalaxyl M: 33%	Liquid	1 L - 55 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 100 kg seed	Specific comments
Cereals: wheat, barley, oats, rye, corn	<i>Pythium</i> damping off	20 - 40 mL	For corn, tank mix with Maxim 480 FS.
Canola	<i>Pythium</i> damping off	20 - 40 mL	Use higher rate into fields with a history of <i>Pythium</i> damping-off disease and/or under high disease pressure.
Beans, peas, soybeans	<i>Pythium</i> damping off	20 - 40 mL	
	Early season Phytophthora root rot	40 mL	
Lentils	<i>Pythium</i> damping off	7 mL	Use for low tannin varieties (domestic seed production or sold for export only).
Forage grasses	<i>Pythium</i> damping off	20 - 40 mL	
Turf grasses	<i>Pythium</i> damping off	40 mL	
Forage legumes: alfalfa, clover, trefoil, vetch	<i>Pythium</i> damping-off and early season Phytophthora root rot	40 mL	
Sunflower	<i>Pythium</i> damping off	40 mL	
	Systemic downy mildew	80 mL	

Application Information

Apply as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry- or mist-type commercial seed treatment equipment that provides uniform seed coverage. Allow the seed to dry before bagging. Seed treated with Apron XL LS or a combination of Apron XL LS and Maxim 480FS may not flow through planting equipment at the same rate as untreated seed. Recalibrate this equipment before planting treated seed. Apron XL LS contains no colourant; an appropriate colourant must be added when applied to seed.

How it Works

Metalaxyl M is an acylalanine fungicide with systemic activity against certain fungal diseases including *Pythium* damping off.

Restrictions

Grazing: Do not graze or feed livestock on seeded area for four weeks after planting.

Environmental Precautions

Do not apply this product directly to freshwater habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. If treated seed is spilled outdoors or in areas accessible to birds, promptly clean up or bury to prevent ingestion.

Toxicity

Ingestion: Low toxicity. Acute oral LD₅₀ (rats) = 2,900 mg/kg. **Dermal:** Slightly toxic. Dermal LD₅₀ (rabbit) = 2,000 mg/kg.

Storage

Store in original container, away from pesticides, food or feed.

Charter/Charter RTU/ Armour

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Armour (PCP # 292960)	Vitera	Triticonazole: 25 g/L	Liquid	6.2 L
Charter (PCP # 26455)	BASF Canada	Triticonazole: 25 g/L	Liquid	9.3 L jug, 200 L drum
Charter RTU (PCP # 29440)	BASF Canada	Triticonazole: 16.8 g/L	Liquid	9.3 L jug, 200 L drum

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases suppressed*	Rate per 100 kg seed	
			Charter/Armour	Charter RTU
Wheat	Seed rot caused by <i>Fusarium</i> sp., seedling blight caused by seedborne <i>Fusarium</i> sp., loose smut, common bunt	<i>Fusarium</i> crown and root rot, <i>Cochliobolus</i> (common) root rot, seedling blight caused by <i>Cochliobolus sativus</i>	200 mL (300 mL diluted product)	300 mL
Barley	Seed rot caused by <i>Fusarium</i> sp., seedling blight caused by seedborne <i>Fusarium</i> sp., true loose smut, covered smut, false loose smut	<i>Fusarium</i> crown and root rot, <i>Cochliobolus</i> (common) root rot, seedling blight caused by <i>Cochliobolus sativus</i>		
Oats	Loose smut, covered smut, seed rot caused by <i>Fusarium</i> sp., seedling blight caused by seedborne <i>Fusarium</i> sp.	<i>Fusarium</i> crown and root rot, <i>Cochliobolus</i> (common) root rot, seedling blight caused by <i>Cochliobolus sativus</i>		

* Suppression is defined as sub-optimal control, which is still of commercial benefit.

Application Information

Charter/Armour: Charter and Armour are concentrated seed treatment formulations for use in commercial seed treatment plants and for use in on-farm standard gravity flow or mist type treatment machines. These formulations can also be used in "On the Go" air seeder treatment systems. Treated seed should not require drying after treatment and can be stored or bagged immediately.

Water Volume: Charter and Armour require the addition of water for application. Recommended dilution is 2 parts Charter or Armour to 1 part water for use on wheat, barley, oats.

Charter RTU: Charter RTU is a ready to use seed treatment formulation for use in commercial seed treatment plants and for use in on-farm standard gravity flow or mist type treatment machines. Charter RTU seed treatment can also be used in "On the Go" air seeder treatment systems. No water or dye is required to be added.

How it Works

The active ingredient of Charter is triticonazole, which provides systemic broad spectrum protection against seed and soil-borne diseases.

Restrictions

Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Ensure proper soil incorporation of the seeds. Do not feed treated seed to, or otherwise expose to wildlife or domestic birds. Ensure proper disposal of any surplus treated seed not intended for later planting. Do not contaminate water supplies or any body of water with the chemical contained in this seed treatment. Do not contaminate water by cleaning of equipment or disposal of wastes. Unused or leftover treated seed should not be stored where there is a chance of it becoming mixed with untreated seed.

Leaching: The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Ingestion: Low toxicity. Acute oral LD₅₀ (rats) = 2,000 mg/kg. **Dermal:** Slightly toxic. Dermal LD₅₀ (rabbit) = 2,600 mg/kg.

Storage

Store in original container away from pesticides, food or feed. Prevent product from freezing.

Crown

Fungicide Group 1, 7

Formulation

Product	Company	Active ingredient	Formulation	Container size
Crown (PCP # 23430)	Chemtura Canada	Carbathiin: 92 g/L + Thiabendazole: 58g/L	Liquid Seed Treatment	10 L, 200 L, 1000 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 25 kg seed	Comments
Lentils	Post-emergence damping off, seed rot caused by <i>Botrytis cinerea</i> , <i>Fusarium</i> and <i>Rhizoctonia</i>	75 - 150 mL	Apply the higher rate when there is a history of high disease pressures in the field.
	Seed-borne <i>Ascochyta</i> (<i>Ascochyta lentis</i>);	150 mL	
Chickpeas	Seed-borne <i>Ascochyta</i> caused by <i>Ascochyta rabiei</i>	75 - 150 mL	Use the higher rate for smaller seed size varieties.

Application Information

Commercial treaters and on-farm auger treating: Crown is a ready to use formulation designed for commercial treaters and on-farm auger treating. Crown is added directly to the seed as it enters a mixing chamber or auger. When a grain auger is used for treating, running the auger less than full is the key to adequate mixing.

Application to seed in a hopper box or seed drill: Partially fill the hopper box or seed drill with a pre-measured amount of seed. Apply the proper amount of Crown evenly over the surface of the seed. Mix with a paddle until all seed is of a uniform red colour, indicating adequate coverage. Repeat this procedure until the hopper box or seed drill is filled. Seed can be planted immediately after treatment without drying.

Seed treatment and inoculum sticker: Crown's liquid properties enable this product to perform as a sticker for inoculants. Crown is safe to the nitrogen-fixing bacterium found in peat and granular inoculants. Partially fill the hopper box or seed drill with a pre-measured amount of seed. Apply the proper amount of Crown evenly over the surface of the seed. Read inoculum label before use. Apply the recommended amount of inoculum evenly over the treated seed and mix thoroughly. Repeat this procedure until the hopper box or seed drill is filled. Seed treated with Crown will remain damp for a period of time following treatment. This enables inoculant added to the hopper box or seed drill to adhere uniformly to seed, thus ensuring adequate nodulation of lentil and chickpea seedlings.

How it Works

Thiabendazole, a fungicide, controls seed-borne diseases. Carbathiin, a systemic fungicide, penetrates the seed coat to control diseases of the seed and seedling.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for four weeks after planting. Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Crown contains a petroleum distillate, which is moderately to highly toxic to aquatic organisms. Do not contaminate water during application, cleaning of equipment or disposing of wastes. Any spilled or exposed seed must be incorporated into the soil or cleaned up from the soil surface.

Crown (cont'd)**Toxicity**

Acute oral LD₅₀ (rats) carbathiin = 3,820 mg/kg; thiabendazole = 3,300 mg/kg.

Storage

Store product in original container only, away from other pesticides, fertilizer, food or feed. Keep container closed. Do not store Crown in direct sunlight. Do not store Crown above 35°C or below 0°C.

Cruiser Maxx Cereals

Insecticide Group 4 Fungicide Group 3, 4

Available to commercial seed treaters only.

Formulation

Product	Company	Active ingredient	Formulation	Container size
Cruiser Maxx Cereals (PCP # 29127)	Syngenta Crop Protection	Thiamethoxam: 2.8% + difenoconazole: 3.36% + metalaxyl - M: 0.56%	Liquid suspension	20 L, 1050 L

Crops, Insects and Diseases Controlled, Rates

Crops	Insects	Diseases controlled	Diseases suppressed ¹	Rate per 100 kg of seed
Barley	Wireworms ¹	General seed rots ² , seedling blight, root rot, and damping-off caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , covered and false loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	325 mL
Wheat, spring	Wireworms ¹	General seed rots ² , seedling blight, root rot, and damping-off caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , common and dwarf bunt, loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	325 mL
Wheat, winter	Wireworms ¹	General seed rots ² , seedling blight, root rot, and damping-off caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> ; Common bunt ⁴ ; loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	

¹ Cruiser Maxx Cereals commercial seed treatment provides suppression of wireworm activity; however, if pressure is moderate to high or control is required, then mix 325 mL of Cruiser Maxx Cereals commercial seed treatment with Cruiser 5FS/350FS seed treatment insecticide to achieve a total use rate of 20-30 g of thiamethoxam per 100 kg seed. Available at commercial treaters only for high rate.

² General seed rots controlled include those caused by saprophytic organisms such as *Fusarium*, *Pythium*, *Penicillium* and *Aspergillus*.

³ Suppression means consistent control at a level which is not optimal but is still of commercial benefit.

⁴ Controls both seed- and soil-borne bunts (common, dwarf).

Registered Tank Mixes

Cruiser Maxx Cereals commercial seed treatment may be mixed with 325 mL of Dividend XL RTA if a) there is a history of high disease pressures in the field, b) where field conditions favour seed-borne and soil-borne pathogens, or c) when controlling seed-borne Septoria.

Application Information

All seed treated with this product must be conspicuously coloured at the time of treatment.

How to apply: Cruiser Maxx Cereals is available on-farm and applied on-farm at the low rate by completing a certified application course. See label for protective equipment when treating or handling treated seed. For more information on higher application rates or high wireworm populations call 1-800-SYNGENTA.

How it Works

Cruiser Maxx Cereals seed treatment is a combination of the insecticide thiamethoxam and the fungicides

difenoconazole and metalaxyl-M (and S-isomer) that controls or suppresses certain insect pests and seed- and soil-borne diseases of cereal crops. Thiamethoxam offers suppression of wireworm activity applied at the on-farm rate on seed and young seedlings. High rate of Cruiser Maxx Cereals is available from commercial treaters for fields with moderate to high wireworm pressures.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for 45 days after planting.

Environmental Precautions

Cruiser Maxx Cereals is a water-based seed treatment containing two fungicides and one insecticide. The insecticidal active ingredient, thiamethoxam is slightly to practically non-toxic to fish, birds and aquatic invertebrates (water flea) but is highly toxic to honeybees and one species of aquatic invertebrate (chironomid). The fungicides, metalaxyl-M and difenoconazole are practically non-toxic to slightly toxic to fish, birds, aquatic invertebrates (water flea) and insects (bees). Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned up from the soil surface.

Toxicity

Practically non-toxic. Acute oral LD₅₀ (rats) = > 5,000 mg/kg. Dermal LD₅₀ (rats) = > 5,000 mg/kg.

Storage

Storage temperature is above freezing and below 30 °C. Repeated freeze-thawing of Cruiser Maxx Cereals will not affect the physical integrity of the product. If the product should freeze, bring the product back to room temperature and ensure the contents are mixed well prior to application.



Danger Poison

DB-Red L

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
DB-Red L (PCP # 27144)	Loveland Products Inc.	Maneb: 323 g/L	Liquid	9 L, 57 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 25 kg of seed
Wheat	Common bunt, root rot, seedling blight (including <i>Fusarium</i>)	78 mL
Barley	Covered smut, false loose smut, root rot, seedling blight.	99 mL
Oats	Covered smut, root rot, seedling blight	138 mL
Rye	Common bunt, root rot, seedling blight	65 mL

Registered Tank Mixes

None registered.

Application Information

DB-Red L is a ready to use seed treatment for use with seed treaters suitable for metering and mixing flowable seed treatment. Treat seeds before sowing at the bin site auger, at the air seeder auger or at the drill fill auger.

Use an AGSCO liquid treater or an equivalent closed seed treating system to achieve uniform chemical coverage on the seed. Treat only those seeds needed for immediate use, minimizing the interval between treatment and planting. Do not store excess treated seeds beyond planting time. Use only the recommended rate. Seed should be well cured, dry and cleaned before treatment. For maximum benefits, avoid deep seeding and exceptionally early sowing under poor growing conditions.

DB-Red L (cont'd)**How it Works**

Maneb is an ethylene bisdithiocarbamate protective fungicide with multi-site activity.

Restrictions

Grazing: Do not graze or feed livestock on treated areas.

Toxicity

Very low acute mammalian toxicity. Acute oral LD₅₀ (rats) = 6,750 mg/kg body weight.

Environmental Precautions

DB-Red L is toxic to fish, birds and other wildlife. Exposed treated seeds may be hazardous to birds and other wildlife. Do not apply directly to water. Do not contaminate any body of water by cleaning of equipment or disposal of wastes and containers.

Storage

Keep product away from heat sources. Store in a cool, dry area. If product becomes frozen, thaw and shake or agitate product.



Danger Poison

DCT

Insecticide Group 1B Fungicide Group M, 1

Formulation

Product	Company	Active ingredient	Formulation	Container size
DCT (PCP # 14986)	Norac Concepts Inc.	Diazinon: 6% + captan: 18% + thiophanate-methyl: 14%	Wettable powder	400 g, 10 Kg

Crops, Insects and Diseases Controlled, Rates

Crops	Insects	Diseases controlled	Rate
Common dry beans	Root maggot	Seed-borne Anthracnose, seedling blight, seed rot	Slurry Machines: 520 g in 1 L of water. Use 1 L of slurry/100 kg of seed
Corn, sweet	Root maggot	Seed-borne <i>Penicillium oxalicum</i> , <i>Penicillium spp.</i>	Seed Box Treatment: 125 g/25 kg of seed

Registered Tank Mixes

None registered.

Application Information

Beans: DCT seed treatment may be applied as a water-based slurry through standard slurry or commercial seed treating equipment. Dry the seed before seeding or bagging. For best results, seed should be planted within a week after treating. Do not store treated seed more than one month before planting. This product will not control anthracnose if seed is severely infected.

Corn: When starting with an empty planter, place enough treated seed in the planter box to cover the bottom. Treat this seed in a separate container that later can be destroyed. Add the remaining seed to the planter box and treat by thoroughly stirring with a paddle so that the seed is coated with the seed treatment.

How it Works

DCT is a dual-purpose seed treatment, containing three active ingredients. Diazinon is an organophosphate insecticide that kills the root maggots by contact and stomach activity. The active ingredient captan is a phthalimide fungicide, controlling the seedling blight and root rot with multi-site activity, and thiophanate-methyl is a methyl-benzimidazole carbamates with systemic activity on anthracnose and other seed-borne diseases.

Restrictions

Do not use treated seeds for food, feed or oil processing.

Toxicity

Irritating to the eyes, skin and respiratory system. Diazinon is a cholinesterase inhibitor. May cause skin sensitization. May cause central nervous system depression. May cause liver and kidney damage.

Captan: Oral LD₅₀ (rat) = > 5,000 mg/kg. Thiophanate-methyl: Oral LD₅₀ (rat) = 6,640 mg/kg. Diazinon: Oral LD₅₀ (rat) = 300 mg/kg.

Environmental Precautions

Highly toxic to aquatic life. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers. DCT has short persistence in soil, crops and water.

Storage

Store in a cool, well ventilated area. Keep containers closed. Keep out of reach of children and pets. Do not expose sealed containers to temperatures above 40°C.



Danger Poison

Dividend XL RTA

Fungicide Group 3, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Divident XL RTA (PCP # 25777)	Syngenta Crop Protection	Difenoconazole: 3.37% + Metalaxyl-M: 0.27%	Liquid suspension	2 x 10 L, 115 L, 450 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases suppressed ¹	Rates/100 Kg seed
Barley	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off seed-borne <i>Septoria</i> ² , covered smut, false loose smut	Common root rot (<i>Cochliobolus</i> spp.) <i>Fusarium</i> crown and foot rot, take-all	325 - 650 mL
Corn	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off		
Oats	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off, covered smut, loose smut	Common root rot (<i>Cochliobolus</i> spp.)	
Rye	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seed-borne <i>Septoria</i> ² , <i>Pythium</i> and <i>Fusarium</i> damping-off, common bunt ³ , dwarf bunt ⁵	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	
Triticale	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off, loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	

Dividend XL RTA (cont'd)

Crops	Diseases controlled	Diseases suppressed ¹	Rates/100 Kg seed
Wheat, spring	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off, seed-borne <i>Septoria</i> ² , common bunt ³ , loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	325 - 650 mL
Wheat, winter	General seed rots ¹ , seedling blight caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off, seed-borne <i>Septoria</i> ² , <i>Septoria</i> leaf blotch ^{2,4} , common bunt ³ dwarf bunt ⁵ , loose smut	Common root rot (<i>Cochliobolus</i> spp.), <i>Fusarium</i> crown and foot rot, take-all	
Buckwheat, millet, sorghum⁶	General seed rots ¹ , seedling blight caused by seed- and soil-borne, <i>Fusarium</i> and soil-borne <i>Pythium</i> , seedling root rot caused by seed- and soil-borne <i>Fusarium</i> and soil-borne <i>Pythium</i> , <i>Pythium</i> and <i>Fusarium</i> damping-off		

Note: One 10 L jug of Dividend XL RTA applied at the 325 mL/100 kg of seed will treat 112 bushels of wheat, and 140 bushels of barley.

1. General seed rots controlled include those caused by saprophytic organisms such as *Fusarium*, *Pythium*, *Penicillium* and *Aspergillus*.
2. Use the 650 mL rate for control of these diseases.
3. Suppression means consistent control at a level which is not optimal but is still of commercial benefit.
4. Early season foliar disease control for first 4 weeks after planting. For full season control apply a foliar fungicide according to label directions.
5. Dividend XL RTA Fungicide controls both seed-borne and soil-borne bunts (common, dwarf).
6. Registered under User Requested Minor Use Label Expansion program.

Registered Tank Mixes

For the control of true loose smut (*Ustilago nuda*) in barley, mix Dividend XL RTA with either Charter, Raxil 250FL or Baytan 30.

Application Information

Dividend XL RTA is a ready-to-use, water-based formulation for use in commercial seed treatment plants and for on-farm treatment using standard gravity flow or mist type seed treatment equipment. Dividend XL RTA may also be used in a treat-on-the-go air seeder. This product does not require the addition of water for application. Use the lower rate under normal field conditions. Use the higher rate if (1) there is a history of high disease pressures in the field, (2) where field conditions favour seed-borne and soil-borne pathogens, or (3) when controlling seed-borne *Septoria* or early season *Septoria* leaf blotch.

How it Works

Dividend XL RTA is a systemic seed treatment that controls or suppresses certain seed- and soil-borne diseases of barley, corn, oats, rye, triticale and wheat.

Restrictions

Grazing: Do not graze, feed green forage or cut for hay within 35 days of planting.

Re-cropping: Do not plant any crop other than barley, corn, oats, rye, triticale or wheat within 30 days to fields in which treated seeds were planted.

Environmental Precautions

This product is toxic to fish and aquatic invertebrates. Do not apply this product directly to freshwater habitats, estuaries or marine habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Do not contaminate food or feed. If treated seed is spilled outdoors or in areas accessible to birds, promptly clean up or bury to prevent ingestion.

Toxicity

Acute oral LD₅₀ (rat) = 5,050 mg/kg. Dermal LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Keep product in heated storage prior to use.

Gaucha CS FL/Gaucha 480 FL



Caution Poison

Insecticide Group 4 Fungicide Group 7. M

Available to commercial seed treaters only.

Formulation

Product	Company	Active ingredient	Formulation	Container size
Gaucha CS FL (PCP #27174)	Bayer CropScience	Imidacloprid: 285.7 g/L + Carbathiin: 47.6 g/L + Thiram: 95.3 g/L	Flowable	10 L, 100 L, 1,000L
Gaucha 480 FL (PCP # 26124)		Imidacloprid: 480 grams/L	Flowable	10 L, 100 L, 1,000L

Crops, Insects and Diseases Controlled, Rates

Crops	Insects controlled	Diseases controlled	Rate per 100 kg of seed
Gaucha CS FL			
Canola, mustard, rapeseed	Early season control of flea beetle	Seed rot, damping-off, seedling blight and early season root rot caused by <i>Pythium</i> , <i>Rhizoctonia</i> and <i>Alternaria</i> . Also controls seed-borne Blackleg of canola and rapeseed	1400 - 2100 mL
Gaucha 480 FL			
Canola, mustard, rapeseed	Early season control of flea beetle		833 - 1667 mL

Note: In areas where flea beetle populations are often high, use the higher rates.

Registered Tank Mixes

For areas where flea beetle populations are often high, tank mix Gaucha CS FL seed treatment with Gaucha 480 FL.

Application Information

For use in commercial seed treatment facilities only. Treated canola, rapeseed or mustard (condiment and oilseed types) seed stored for periods in excess of 9 months may decrease in germination at a faster rate than untreated seed. Treated seed stored for more than 9 months should be tested for germination before planting.

How it Works

Gaucha CS FL is a systemic insecticide and fungicide seed treatment. The insecticide imidacloprid is for early season protection from flea beetles. Gaucha CS FL seed treatment contains the fungicides carbathiin and thiram. These fungicides control seed rot, damping off, seedling blight and early season root rot caused by *Pythium*, *Rhizoctonia* and *Alternaria* on canola, rapeseed and mustard (condiment and oilseed types), also controls seed-borne blackleg of canola and rapeseed.

Restrictions

Do not use treated seed for food, feed or oil processing. Do not graze or feed livestock on treated areas for four weeks after planting. Mustard greens grown or harvested from Gaucha CS FL seed treatment-treated seed must not be used for human consumption.

Grazing: Do not graze or feed livestock on treated areas for four weeks after planting.

Environmental Precautions

Gaucha CS FL is highly toxic to birds and aquatic invertebrates. Do not apply directly to water or to areas where surface water is present. Do not contaminate water when disposing of equipment wash waters. Cover or incorporate spilled treated seeds.

Gaucha CS FL/Gaucha 480 FL (cont'd)**Toxicity**

Non-toxic. Acute oral LD₅₀ (rat) = 3,067 mg/kg. Acute dermal LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Store product in original container. Do not store above 35° Celcius.



Danger Poison

Gemini

Fungicide Group 3, M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Gemini (PCP #27826)	BASF	Triticonazole: 1.25% + Thiram: 12.5%	Liquid Flowable	2 X 6 L, 200 L

Crops, Insects and Diseases Controlled, Rates

Crops	Diseases controlled	Diseases suppressed ¹	Rates per 100 Kg seed
Barley	Covered smut, false loose smut, true loose smut <i>Pythium</i> damping-off, seed rot and seedling blight caused by seed and soil-borne <i>Fusarium</i> sp.	Common root rot and seedling blight caused by <i>Cochliobolus</i> , <i>Fusarium</i> crown and root rot	360 mL
Oats	Covered smut, loose smut		
Wheat	Common bunt, loose smut, <i>Pythium</i> damping off, Seed rot caused by <i>Fusarium</i> sp., seedling blights caused by seed and soil-borne <i>Fusarium</i> sp.	<i>Fusarium</i> crown and root rot, seedling blight and common root rot caused by <i>Cochliobolus</i>	

¹ Suppression means consistent control at a level not optimal but still of commercial benefit.

Bushels Treated

Container size	Barley [*]	Oats ^{**}	Wheat ^{***}
6 L	75	108	61
200 L drum	2,552	3,602	2,041

* Based on barley at 21.8 kg/bu (48 lbs/bushel), ** based on oats at 15.4 kg/bu (34 lbs/bushel), *** based on wheat at 27.3 kg/bu (60 lbs/bu)

Registered Tank Mixes

None registered.

Application Information

Gemini is a ready-to-use seed treatment formulation for use in commercial seed treatment plants and for use in on-farm standard gravity flow or mist type treatment machines. Gemini can also be used in "On the Go" air seeder treatments systems. When used at the recommended rate of 360 mL/100 kg seed, no additional dyes or dilutions with water are needed unless recommended by the manufacturer of the seed treatment application equipment/machines.

How it Works

The active ingredients in Gemini are triticonazole and thiram. Triticonazole is a triazole fungicide that provides systemic broad spectrum protection against seed- and soil-borne diseases. Thiram is a dithiocarbamate fungicide with contact activity.

Restrictions

Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Gemini is toxic to birds and wildlife. Ensure proper soil incorporation of the seeds. If treated seed is spilled outdoors or in areas accessible to birds, promptly clean up or bury to prevent ingestion. Ensure proper disposal of any surplus treated seed not intended for later planting. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds or any body of water with the chemical, used containers, treated seed or bags that have held treated seed. Do not contaminate water by cleaning of equipment or disposal of wastes.

Leaching: The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Low toxicity. Acute oral LD₅₀ (rat) = >2,000 mg/kg rats. Acute dermal LC₅₀ (rat) = >2,000 mg/kg.

Storage

Store in original container. Store in an area away from food, feed stuffs, fertilizers and seed. Protect from frost and freezing.



Caution Poison

Helix/Helix Xtra

Insecticide Group 4 Fungicide Group 3, 4, 12

Formulation

Product	Company	Active ingredient	Formulation	Container size
Helix (PCP # 26637)	Syngenta Crop Protection	Thiamethoxam: 10.3% + Difenoconazole: 1.24% Metalaxyl-M: 0.39% + Fludioxonil: 0.13%	Liquid	105 L, 200 L, 450 L, 1,000 L, 1,050 L, Bulk
Helix Xtra (PCP # 26638)		Thiamethoxam: 20.7% + Difenoconazole: 1.25% Metalaxyl-M: 0.39% + Fludioxonil: 0.13%		

Crops, Insects and Diseases Controlled, Rates

Products	Crops	Insects controlled	Diseases controlled	Rate per 100 kg of seed
Helix	Canola, oriental mustard (oil seed and condiment type)	Early season control of flea beetle (14 – 21 days)	Seed-borne blackleg, seed-borne <i>Alternaria</i> and the seedling disease complex (damping-off, seedling blight, seed rot and root rot) caused by <i>Pythium</i> spp., <i>Fusarium</i> spp. and <i>Rhizoctonia</i> spp.	1.5 L
Helix Xtra		Early season control of flea beetle: (28 – 35 days)		

Application Information

For use in commercial seed treatment facilities with closed transfer systems only. No open transfer of Helix/Helix Xtra liquid seed treatment. All seed treated with this product must be conspicuously coloured at the time of treatment. Consult the manufacturer of the seed treating equipment for advice on the operation and calibration of the equipment. Allow the seed to dry before bagging.

How it Works

Helix and Helix Xtra Liquid seed treatments contain an insecticide (thiamethoxam) and three fungicides (difenoconazole, metalaxyl-M and S-isomer, and fludioxonil). The insecticide provides early season control of flea beetles (Helix: 14 - 21 days; Helix Xtra: 28 - 35 days). The fungicide component of these seed treatments provides early season control of seed-borne blackleg (*Leptosphaeria maculans*), seed-borne *Alternaria* (*Alternaria* spp.) and the seedling disease complex (damping-off, seedling blight, seed rot and root rot) caused by *Pythium* spp., *Fusarium* spp. and *Rhizoctonia* spp.

Restrictions

Treated seed must not be used for food, feed or oil processing.

Helix/Helix Xtra (cont'd)**Environmental Precautions**

Do not apply this product directly to freshwater habitats, estuaries or marine habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. If treated seed is spilled outdoors, promptly clean up.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD_{50} (rat) = > 5,000 mg/kg. **Dermal:** Slightly toxic. Acute LD_{50} (rat) = > 2,000 mg/kg.

Storage

Helix/Helix Xtra treated canola and mustard can be stored for 18 months without loss in germination or insect and disease performance.

MancoPlus PSPT/Tuberseal PSPT/ Potato ST 16

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Manco Plus PSPT (PCP # 26157)	Norac Concepts Inc.	Mancozeb: 16 %	Dust	10 kg bag
Potato ST 16 (PCP # 24734)	United Agri Products	Mancozeb: 16 %	Dust (with alderbark)	20 kg bag
Tuberseal (PCP # 17042)	Norac Concepts Inc.	Mancozeb: 16 %	Dust	10 kg bag

Crops, Diseases Controlled and Rates

Crop	Diseases	Rate per 100 kg seed
Potato seed pieces	<i>Fusarium</i> seed piece decay	500 g

Registered Tank Mixes

None registered.

Application Information

Potatoes Seed Pieces: Thoroughly coat the surface of whole or cut seed pieces with dust. If treated whole seed is cut, make a second application to protect the cut surfaces. Plant as soon as possible after treating. However, if planting of cut seed is delayed beyond 2 days after treating, seed should be air dried before bagging or loose piling.

Environmental Precautions

Do not contaminate food or any body of water.

Toxicity

Ingestion: Acute Oral LD_{50} (rat) = > 5,000 mg/kg. Practically non-toxic. **Dermal:** Acute LD_{50} (rabbit) = > 5,000 mg/kg.

Storage

Store product in a cool, dry, ventilated place. Do not allow product to become wet or overheated during storage as chemical changes may occur which impair fungicidal effectiveness and may also generate flammable vapours.

Maxim PSP/Maxim MZ PSP



Caution Poison

Fungicide Group Maxim MZ PSP 12, M3 Maxim PSP 12

Formulation

Product	Company	Active ingredient	Formulation	Container size
Maxim MZ PSP (PCP # 27965)	Syngenta Crop Protection	Fludioxonil: 0.5% + Mancozeb: 5.7%	Dry Powder	10 kg, 20 kg, 22.7 kg bag
Maxim PSP (PCP # 26647)		Fludioxonil: 0.5%		10 kg bag

Crops, Diseases Controlled and Rates

Crops	Diseases	Rate: per 100 kg seed
Potato seed piece treatment	Black scurf (<i>Rhizoctonia solani</i>), silver scurf (<i>Helminthosporium solani</i>), and <i>Fusarium</i> dry rot (<i>Fusarium</i> spp.).	500 grams

Registered Tank Mixes

None registered.

Application Information

Apply using equipment that ensures uniform and thorough coverage of each seed piece. Cut pieces should be treated immediately after cutting. Treated seed pieces should be planted in soil above 7°C with adequate soil moisture required for planting. If cut seed needs to be stored or held for a few days, make sure that there is adequate cool air (15.5°C) movement through the pile of cut seed potatoes at relative humidity of 85-90%. Cut and treated seed should not be piled above 1.8 m in height.

How it Works

Fludioxonil is a phenylpyrrole chemistry that possesses contact and local penetrant properties. Mancozeb is a dithiocarbamate fungicide with contact activity.

Restrictions

Do not use treated seed pieces for food or feed purposes.

Environmental Precautions

Maxim MZ PSP/Maxim PSP is toxic to fish and aquatic invertebrates. Do not apply directly to water or to areas where surface water is present. Do not contaminate water by cleaning of equipment or disposal of equipment wash waters.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD₅₀ (rat) = > 5,050 mg/kg. **Dermal:** Slightly toxic. Acute LD₅₀ (rabbit) = > 2,200 mg/kg.

Storage

Store in a dry place.

Mertect SC

Fungicide Group 1

Formulation

Product	Company	Active ingredient	Formulation	Container size
Mertect SC (PCP # 13975)	Syngenta Crop Protection	Thiabendazole: 500 g/L	Water dispersible suspension	4 X 5 L

Crops, Diseases Controlled and Rates

Crops	Diseases	Rate
Potatoes (tubers) post-harvest	Post harvest control of storage rots caused by <i>Fusarium</i> spp., <i>Phoma</i> spp., <i>Helminthosporium</i> spp., <i>Oospora</i> spp., and <i>Rhizoctonia</i> spp.	7.5 L of Mertect SC per 170 L of water. Spray 2 L of this suspension per 1,000 kg of potato tubers.

Application Information

Shake well before using. Potatoes must rotate along the conveyor line into storage to ensure complete coverage.

Restrictions

Grazing: Do not feed or allow livestock to graze on treated crops.

Re-entry: Do not enter or allow worker entry into treated areas during the restricted entry interval of 12 hours.

Environmental Precautions

Mertect SC is toxic to aquatic organisms. Do not allow effluent or runoff containing this product to enter lakes, streams, ponds or other waters. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Toxicity

Ingestion: Slightly toxic. Acute Oral LD₅₀ (rat) = > 3,100 mg/kg. Dermal: Slightly toxic. Acute LD₅₀ (rabbit) = >2,000 mg/kg.

Storage

Store in a dry place.

Polyram 16 D Seed Piece Treatment

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Polyram 16 D (PCP # 25867)	BASF Canada	Metiram: 16%	Dry flowable	10 kg bag

Crops, Diseases Controlled and Rates

Crops	Diseases	Rate per 100 kg seed pieces
Potatoes (tubers)	<i>Fusarium</i> seed piece decay, seed-borne common scab (<i>Streptomyces</i> spp.)	0.45 - 0.65 kg

Application Information

Before seed is cut, warm seed to 18°C to 21°C for about 2 weeks in dim light. Cut seed should be planted immediately. If this cannot be done, store in containers such as crates or burlap bags stacked to allow air movement around each container. Hold at 10°C to 16°C and high relative humidity for 3 to 4 days to allow wound cork to form over cut surfaces. Never allow cut seed to stand in hot sun or drying winds. Do not plant in hot, dry soil or in cold, wet soil. Apply to entire surface of seed pieces after cutting. May be applied to uncut seed pieces at the same rate for control of seed-borne common scab. If treated whole seed is cut after treatment, a second application is needed to control fusarium seed piece decay.

Note: Polyram contains no colourant. An appropriate colourant must be added when Polyram is applied.

Environmental Precautions

Do not contaminate domestic or irrigation water, lakes, streams or ponds by the cleaning of equipment or the disposal of wastes.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD₅₀ (rat) = > 5,000 mg/kg. **Dermal:** Slightly toxic. Acute LD₅₀ (rabbit) = > 2,000 mg/kg.

Storage

Store in original, tightly closed container. Do not ship or store near food, feed, seed or fertilizers. Store in cool, dry, locked, well ventilated area without floor drain. Keep away from heat, fire or sparks. Protect from freezing.



Warning Poison

Poncho 600 FS/Clutch

Group 4

Formulation

Product	Company	Active ingredient	Formulation	Container Size
Clutch (PCP # 29382)	Valent Canada Inc.	Clothianidin 50%	Water dispersible granules	
Poncho 600 FS (PCP # 27453)	Bayer CropScience	Clothianidin 60%	Flowable	3.8 L, 10L, 100L, 1000L

Crops, Insects Controlled and Rates**Poncho 600 FS**

Crops	Insects controlled	Rate	Remarks
Canola/ Rapeseed	Flea beetle	250 mL/100 kg seed	Use under low to moderate flea beetle pressure.
		333 mL/100 kg seed	For higher level of control under moderate pressure.
		666 mL/100 kg seed	Use under high to extreme high flea beetle pressure.
Corn	Corn rootworm	166.7 mL of product per 80,000 units of seed	The application rate recommended for corn rootworm also provides control of other listed corn pests.
	Corn flea beetle, cutworm (black), seed corn maggot, wireworm, white grub	33.3 - 66.6 mL of product per 80,000 units of seed.	If corn rootworm is not a target pest, use lower rates for control of other listed corn pests.

Poncho 600 FS/Clutch (cont'd)**Registered Tank Mixes**

Crops	Insect controlled	Rate per 100 kg seed	Remarks
Canola/rapeseed	Flea beetle	Poncho 600 FS: 83 mL + Prosper FL: 1250 mL	For a higher level of control under moderate flea beetle pressure.
		Poncho 600 FS: 417 mL + Prosper FL: 1250 mL	For use under high to extreme flea beetle pressure, where extended control is required.

Note: When tank mixing, use closed transfer systems only.

Clutch

Crops	Insect controlled	Rate	Remarks
Potato	Colorado potato beetle	2.38-4.0 g/100 m row based on 90 cm row spacing	In-furrow application. Ensure thorough coverage by using sufficient water volume.
	Aphids, Colorado potato beetle, leafhoppers	28-42 g/acre	Foliar application. For ground application, apply in sufficient water volume for thorough coverage. Apply by air in 18-20 L water/acre.

Application Information

Poncho 600 FS is for use in commercially available equipment designed for seed treatment only. This product is to be used in liquid or slurry treaters. Mix thoroughly before use or use entire container at one time.

How it Works

Clothianidin is a systemic chloronicotinyl insecticide. It protects the seed and developing plant from insect damage.

Environmental Precautions

This product is toxic to aquatic invertebrates. This product is also toxic to wild birds and wild mammals when used as a seed treatment. Do not expose treated seeds on soil surface. Any spilled or exposed seeds should be incorporated into the soil or otherwise cleaned up from the soil surface. Do not apply directly to water or to areas where surface water is present.

Leaching: The use of Poncho 600 FS seed treatment in areas where soils are permeable, particularly where water table is shallow, may result in groundwater contamination.

Restrictions

Rape greens and rapeseed grown or harvested from Poncho 600 FS seed treatment seed must not be used for feed or human consumption. Rapeseed grown and harvested from 600 FS seed treatment is only for industrial uses and cannot be used for edible oil or any other human/feed consumption.

Toxicity

Acute oral LD₅₀ (rats) = technical >5,000.

Storage

Store in a cool, dry place out of direct sunlight. Do not allow product to freeze.

Rancona Apex

Fungicide Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Rancona Apex (PCP # 29176)	Chemtura	Ipconazole: 4.61g/L	Suspension	10 L, 200 L, 1000 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases Suppressed	Rate per 100 kg of seeds
Barley	General seed rots (including those caused by saprophytic organisms such as <i>Penicillium</i> and <i>Aspergillus</i>), seed rot, damping off and seedling blight (seed- and soil-borne <i>Fusarium</i>), seed rot and seedling blight (seed and soil-borne <i>Cochliobolus sativus</i>), True loose smut Covered smut False loose smut Leaf stripe (<i>Pyrenophora graminea</i>)	Common root rot caused by <i>Cochliobolus sativus</i> Crown and foot rot caused by <i>Fusarium</i> spp.	325 mL
	True loose smut control. Use the higher rate for highly infected seed lots only	Same as above at 325 mL rate	325 - 433 mL
Wheat (spring and winter)	General seed rots (including those caused by saprophytic organisms such as <i>Penicillium</i> and <i>Aspergillus</i>), seed rot, damping off and seedling blight (seed- and soil-borne <i>Fusarium</i>), seed rot and seedling blight seed and soil-borne <i>Cochliobolus sativus</i>) Loose smut Common bunt	Common root rot caused by <i>Cochliobolus sativus</i> Crown and foot rot caused by <i>Fusarium</i> spp.	325 mL
Oats	General seed rots (including those caused by saprophytic organisms such as <i>Penicillium</i> and <i>Aspergillus</i>), seed rot, damping off and seedling blight (seed- and soil-borne <i>Fusarium</i>), seed rot and seedling blight (seed and soil-borne <i>Cochliobolus sativus</i>) Loose smut Covered smut	Common root rot caused by <i>Cochliobolus sativus</i> Crown and foot rot caused by <i>Fusarium</i> spp.	325 mL
Rye and triticale	General seed rots (including those caused by saprophytic organisms such as <i>Penicillium</i> and <i>Aspergillus</i>), seed rot, damping off and seedling blight (seed- and soil-borne <i>Fusarium</i>) Seed rot and seedling blight (seed and soil-borne <i>Cochliobolus sativus</i>)	Common root rot caused by <i>Cochliobolus sativus</i> Crown and foot rot caused by <i>Fusarium</i> spp.	325 mL

Application Information

Rancona Apex is a ready to use formulation and should be applied utilizing mechanical, slurry or mist-type on-farm or commercial seed treating equipment.

How it Works

Rancona is a broad-spectrum fungicide with systemic properties.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for 30 days after planting.

Do not use treated seed for food, feed or oil processing.

Rancona Apex (cont'd)**Environmental Precautions**

Treated seed is toxic to birds and small wild mammals. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned up from the soil surface. Do not contaminate irrigation water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD₅₀ (rat) = > 5,000 mg/kg. **Dermal:** Non-toxic. Acute LD₅₀ (rabbit) = > 5,000 mg/kg.

Storage

Keep product stored away from food and feed. Store product at temperatures between 0° C and 35° C.

Raxil MD**Group 3, 4****Formulation**

Product	Company	Active ingredient	Formulation	Container size
Raxil MD (PCP # 27692)	Bayer CropScience	Tebuconazole: 5.0 g/L + Metalaxyl: 6.6 g/L	Suspension	2 X 10 L, 200 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases suppressed	Rate per 100 kg of seeds	Bushels treated per 10 L jug
Wheat	Loose smut, common bunt or stinking smut, seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Fusarium</i> spp., seedling blight caused by seed-borne <i>Fusarium</i> spp., damping-off caused by <i>Pythium</i> spp., seed-borne <i>Septoria nodorum</i>	Root and crown rot caused by seed- and soil-borne <i>Fusarium</i> spp., common root rot caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seedling blight caused by seed-borne <i>Cochliobolus sativus</i>	300 mL	122*
Barley	True loose smut, covered smut, false loose smut, seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Fusarium</i> spp., seedling blight caused by seed-borne <i>Fusarium</i> spp., damping-off caused by <i>Pythium</i> spp., barley leaf stripe	Root and crown rot caused by seed- and soil-borne <i>Fusarium</i> species, common root rot caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seedling blight caused by seed-borne <i>Cochliobolus sativus</i>	300 mL	153**
Oats	Covered smut, loose smut, seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Fusarium</i> spp., seedling blight caused by seed-borne <i>Fusarium</i> spp., damping-off caused by <i>Pythium</i> spp.	Root and crown rot caused by seed- and soil-borne <i>Fusarium</i> species, common root rot caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping-off caused by seed- and soil-borne <i>Cochliobolus sativus</i> , seedling blight caused by seed-borne <i>Cochliobolus sativus</i>	300 mL	216***

* Based on wheat at 27.3 kg/bu (60 lbs/bu), ** based on barley at 21.8 kg/bu (48 lbs/bushel), *** based on oats at 15.4 kg/bu (34 lbs/bushel)

Application Information

Raxil MD is a ready to use formulation designed for commercial or on-farm treating with conventional seed treating equipment that can accurately control application rates and provide good distribution of the chemical onto the seed in

the mixing chamber. Uniform application to seed is necessary to ensure seed safety and best disease control.

How it Works

Raxil MD is a systemic fungicide that is absorbed into the germinating seed and transported through the growing seedling, providing control of seed and seedling diseases.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for 4 weeks after planting. Do not use for food, feed or oil processing.

Environmental Precautions

The use of this product may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Do not expose treated seeds on the soil surface. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil surface.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD₅₀ (rat) = > 5,050 mg/kg.. Dermal: Practically non-toxic Acute LD₅₀ (rabbit) = > 5,050 mg/kg.

Storage

Store product in original container only, away from other pesticides, fertilizer, food or feed. Store in a cool, dry place and avoid excessive heat.

Raxil T

Group 3, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Raxil T (PCP # 27566)	Bayer CropScience	Tebuconazole: 6.7 g/L + Thiram: 222 g/L	Suspension	2 X 10 L, 200 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases suppressed	Rate per 100 kg of seed
Wheat	Seed rot caused by seed- and soil-borne <i>Fusarium</i> , seedling blight caused by seed-borne <i>Fusarium</i> , seed rot and seedling blight caused by <i>Cochliobolus sativus</i> , seed rot caused by saprophytic fungi <i>Penicillium</i> , <i>Aspergillus</i> and <i>Alternaria</i> , seed-borne <i>Septoria</i> , common bunt, loose smut, <i>Pythium</i> seed rot	<i>Fusarium</i> root rot and <i>Fusarium</i> crown rot, common root rot caused by <i>Cochliobolus sativus</i>	225 mL
Barley	Seed rot caused by seed- and soil-borne <i>Fusarium</i> , seedling blight caused by seedborne <i>Fusarium</i> , seed rot and seedling blight caused by <i>Cochliobolus sativus</i> , seed rot caused by saprophytic fungi <i>Penicillium</i> , <i>Aspergillus</i> and <i>Alternaria</i> , false loose smut, covered smut, loose smut, <i>Pythium</i> seed rot	<i>Fusarium</i> root and crown rot, common root rot caused by <i>Cochliobolus sativus</i>	225 mL
Oats	Seed rot caused by seed- and soil-borne <i>Fusarium</i> , seedling blight caused by seedborne <i>Fusarium</i> , seed rot and seedling blight caused by <i>Cochliobolus sativus</i> , loose smut, <i>Pythium</i> seed rot	Common root rot caused by <i>Cochliobolus sativus</i>	225 mL

Application Information

Raxil T is a ready to use formulation designed for commercial or on-farm treating with conventional seed treating equipment. Seed is protected by Raxil T as soon as it is treated, and seed may be planted immediately. Germination

Raxil T (cont'd)

will not be affected by treatment as long as over application does not occur and seed is properly stored.

Application Tips: Uniform coverage at the correct rate is important for satisfactory results.

How it Works

Raxil is a systemic fungicide that is absorbed into the germinating seed and transported through the growing seedling, providing control of seed and seedling diseases.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for 4 weeks after planting.

Environmental Precautions

Treated seed may be toxic to birds and other wildlife. Clean up any spilled seed. Ensure that treated seed is properly incorporated at planting. Do not contaminate ponds, lakes or streams.

Toxicity

Ingestion: Slightly toxic. Acute Oral LD₅₀ (rat) = 1,951 mg/kg. **Dermal:** Slightly toxic. Acute LD₅₀ (rabbit) = > 2,020 mg/kg.

Storage

Store product in original container only. Store away from other pesticides, fertilizer, food or feed. Store both product and/or treated seed in a cool, dry place and avoid excessive heat.

Raxil WW Seed Treatment

Insecticide Group 4 Fungicide Group 3, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Raxil MD (PCP# 29280)	Bayer CropScience	Tebuconazole (5 g/L) + metalaxyl (6.6 g/L)	Suspension	10 L + 2.1 L
Stress Shield		Imidacloprid (480 g/L)		

Crops, Insects and Diseases Controlled, Rates

Crops	Insects	Diseases	Rate per 100 kg of seed
Wheat	Wireworm: early season protection against crop stand injury	Controlled: Loose smut, common bunt, seed rot and pre-emergent damping-off caused by seed and soil borne <i>Fusarium</i> spp., damping off caused caused by <i>Pythium</i> spp, seed borne <i>Septoria nordum</i> Suppression: Root and crown rot caused by seed and soil borne <i>Fusarium</i> spp., common root rot caused by seed and soil borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping off caused by seed and soil borne <i>Cochliobolus sativus</i> and seedling blight caused by seed borne <i>Cochliobolus sativus</i>	Raxil MD: 300 mL Stress Shield: 63 mL

Raxil WW Seed Treatment (cont'd)

Crops	Insects	Diseases	Rate per 100 kg of seed
Barley	Wireworm: early season protection against crop stand injury	Controlled: True loose smut, covered smut, false loose smut, seed rot and pre-emergent damping-off caused by seed and soil borne <i>Fusarium</i> spp., damping off caused by <i>Pythium</i> spp, and barley leaf stripe Suppression: Root and crown rot caused by seed and soil borne <i>Fusarium</i> spp., common root rot caused by seed and soil borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping off caused by seed and soil borne <i>Cochliobolus sativus</i> and seedling blight caused by seed borne <i>Cochliobolus sativus</i>	Raxil MD:300 mL Stress Shield: 63 mL
Oats	Wireworm: early season protection against crop stand injury	Controlled: Covered smut, loose smut, seed rot and pre-emergent damping-off caused by seed and soil borne <i>Fusarium</i> spp., damping off caused by <i>Pythium</i> spp. Suppression: Root and crown rot caused by seed and soil borne <i>Fusarium</i> spp., common root rot caused by seed and soil borne <i>Cochliobolus sativus</i> , seed rot and pre-emergent damping off caused by seed and soil borne <i>Cochliobolus sativus</i> , seedling blight caused by seed borne <i>Cochliobolus sativus</i>	Raxil MD:300 mL Stress Shield: 63 mL

Registered Tank Mixes

None registered.

Application Information

How to apply: Pour container of Stress Shield into Raxil MD container and mix thoroughly. Raxil WW can be used in commercial and on-farm seed treatment equipment that can accurately control application rate and provide good coverage of treated seed.

Application Tips

Uniform application to seed is necessary to ensure seed safety and best protection against disease and insects.

How it Works

Raxil WW contains a systemic fungicide that provides control of seed and seedling diseases. Raxil WW also contains a systemic insecticide that provides protection from damage caused by chewing and sucking insects through contact and systemic activity.

Restrictions

Treated seed must not be used for food, feed or oil processing.

Grazing: Do not graze or feed livestock on treated areas for 4 weeks after planting.

Environmental Precautions

Toxic to birds and aquatic invertebrates. Do not apply this product directly to water or to areas where surface water is present. Cover or incorporate spilled treated seeds.

Toxicity

Acute oral LD₅₀ (male/female rat) = 3,067 mg/kg.

Storage

Do not store in direct sunlight. Store in a cool, dry place and avoid excessive heat. Store product in original container away from pesticides, fertilizers, food and feed.

Senator PSP

Fungicide Group 1

Formulation

Product	Company	Active ingredient	Formulation	Container size
Senator PSP (PCP # 14599)	Nippon Soda Company	Thiophanate-methyl: 10%	Dust	10 kg bag

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 100 kg of cut seed
Potato	Verticillium wilt, <i>Fusarium</i> rot, silver scurf (<i>Helminthosporium solani</i>), and aids in control of seed piece decay and black leg infections	500 g

Application Information

Apply in a convenient container or by dust attachment over belt. Cut pieces should be treated within 6 hours of cutting. If planting is to be delayed more than 1 to 2 days, the treated pieces should be stored for 2 - 3 days in open crates before bagging.

Application Tips: Senator PSPT contains no colourant. An appropriate colourant must be added when this product is applied. For optimum control of silver scurf, ensure that seed tubers are completely free of soil. Total skin coverage is essential. Reduced control can be expected in fields where volunteers from the previous year's crop act as a source of infection.

Environmental Precautions

By-products from this product are toxic to aquatic organisms. Do not contaminate any body of water or groundwater when disposing of equipment washwater.

Toxicity

Ingestion: Practically non-toxic. Acute Oral LD₅₀ (rat) = > 6,000 mg/kg.

Storage

Store in a dry place.



Warning Poison

Thiram 75 WP

Fungicide Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Thiram 75 WP (PCP # 27556)	Chemtura Canada	Thiram: 75%	Wettable Powder	5 kg, 25 kg

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate per 25 kg of seed
Alfalfa	Verticillium wilt	90 g
Dry beans, snap beans, peas, soybeans	Seed decay, seedling blight and damping-off	25 - 30 g
Field corn	Seed decay, seedling blight and damping-off	30 g
Grasses	Seed decay, seedling blight and damping-off	90 g

Crops	Diseases controlled	Rate per 25 kg of seed
Oilseed mustard	Seed rots, damping-off and seedling blights	90 g
Safflower	Seed decay, damping off, seedling blight and root rot	50 g
Sweet corn	Seed decay, damping off, seedling blight and root rot	55 g
Sugar beet	Seed decay, damping off, seedling blight and root rot	90 g

Application Information

For the following crops, premix Thiram 75 WP in water as indicated below and apply with commercial seed treating equipment.

kg Thiram 75 WP	Litres of water	kg of seed treated
Alfalfa		
1.5	5	416
3.0	10	833
4.5	15	1250
Oilseed mustard		
1.5	2.5 - 6.25	416
3.0	5.0 - 12.5	833
4.5	7.5 - 18.75	1250

How it Works

Thiram is a protective fungicide applied as a seed-treatment powder.

Restrictions

Grazing: Do not graze treated areas or feed clippings from treated areas to livestock.

Environmental Precautions

Treated seed may be harmful to birds if ingested. Do not contaminate any body of water.

Toxicity

Low mammalian toxicity. Acute oral LD₅₀ (rats) thiram = 780 - 865 mg/kg.

Storage

Store in a cool, dry, ventilated place away from feeds and foods. Keep away from heat, fire and sparks.

Trilex AL

Fungicide Group 11, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Trilex AL (PCP #29160)	Bayer CropScience	Trifloxystrobin: 13.5 g/L + metalaxyl: 10.8 g/L	Suspension	2 x10 L, 200 L

Trilex AL (cont'd)**Crops, Diseases Controlled and Rates**

Crops	Diseases controlled	Rate per 100 kg of seed
Beans (succulent, snap, dry)	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Pythium</i> spp.	370 mL
Chickpeas Peas (field, dry)	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Pythium</i> spp. Suppression of seed-borne <i>Ascochyta</i> blight caused by <i>Ascochyta</i> spp.	
Lentils	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Pythium</i> spp. Seed rot/pre-emergence damping-off, post-emergence damping-off and seedling blight caused by <i>Botrytis cinerea</i> (seedborne) Suppression of seed-borne <i>Ascochyta</i> blight caused by <i>Ascochyta</i> spp.	
Soybeans	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Pythium</i> spp. Seed decay/pre-emergence damping-off caused by <i>Phomopsis longicolla</i> .	

Application Information

Trilex AL Fungicide is a ready-to-use formulation designed for commercial or on-farm treating with conventional seed treating equipment. Uniform application on seed is necessary to ensure seed safety and best disease protection.

Caution: If Trilex AL Seed Treatment Fungicide is diluted with water by greater than 10% by volume, ensure agitation of the mixture prior to application to seed.

Compatibility with inoculants: Trilex AL is compatible with Rhizobium-based inoculants. Please check with inoculant manufacturers for further details prior to use.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for four weeks after planting. Treated seed must not be used for food, feed or oil processing.

Re-cropping: Canola, mustard, rapeseed, corn, legumes and cereal grains may be re-planted at any time. For all other crops, do not plant back within 30 days of seeding with Trilex AL treated seed.

Environmental Precautions

Trilex AL is toxic to aquatic organisms. Do not discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other waters. Dispose of all excess treated seed. Leftover treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements.

Leaching: Residues of this product demonstrate the properties and characteristics associated with chemicals detected in groundwater. The use of this product may result in contamination of groundwater, particularly in areas where soils are permeable (e.g., sandy soil) and/or depth to the water table is shallow.

Toxicity

Ingestion: Slightly toxic. Acute Oral LD₅₀ (rat) = 5,000 mg/kg. Dermal: Slightly toxic. Acute LD₅₀ (rabbit) = 5,000 mg/kg.

Storage

Store product in original container only, away from other pesticides, fertilizer, food or feed. Store in a cool, dry place and avoid excessive heat.

Vitaflo 280

Fungicide Group 7, M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Vitaflo 280 (PCP # 11423)	Chemtura Canada	Carbathiin: 15.59% + Thiram: 13.25%	Liquid suspension	10 L, 200 L

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Diseases suppressed	Rate per 100 kg of seed
Barley*	Covered and true loose smut, false loose smut, leaf stripe, seed rot and seedling blight caused by <i>Pythium</i> spp. and <i>Penicillium</i> spp., <i>Aspergillus</i> spp. and <i>Alternaria</i>	Net blotch, Fusarium root rot, common root rot	230-330 mL
Wheat*	Loose smut, stinking smut (common bunt), seed-borne dwarf bunt, seed rot, seedling blight caused by <i>Cochliobolus sativus</i> , <i>Fusarium</i> , <i>Pythium</i> spp., <i>Aspergillus</i> , <i>Penicillium</i> and <i>Alternaria</i> spp., seed-borne <i>Septoria</i>	Root rot caused by <i>Cochliobolus sativus</i> and <i>Fusarium</i> spp.	230 - 330 mL
Oats	Covered smut, loose smut, seed rot and seedling blight caused by <i>Fusarium</i> spp.	Root rot caused by <i>Cochliobolus sativus</i>	330 mL
Rye*	Damping-off, seedling blight and seed decay, stem smut, seed rot and seedling blight caused by <i>Pythium</i> spp., and <i>Penicillium</i> spp. <i>Aspergillus</i> spp. and <i>Alternaria</i>	Root rot caused by <i>Fusarium</i> spp. and <i>Cochliobolus sativus</i>	230 - 330 mL
Triticale	Damping-off, seedling blight and seed decay		200 mL
Corn (field and sweet)	Damping off, seed decay		280 mL
	Corn head smut***		560-750 mL
Common dry beans, snap dry beans	Early season seed rot, root rot and seedling blight caused by <i>Rhizoctonia solani</i> , Seedborne Anthracnose (<i>Colletotrichum lindemuthianum</i>).		260 mL
Lentils	Early season root rot and seedling blight caused by <i>Botrytis cinerea</i> , <i>Fusarium</i> , <i>Pythium</i> spp. and <i>Rhizoctonia solani</i> , seed rot, seedling blight		330 mL
Peas **	Seed rot and seedling blight caused by <i>Mycosphaerella</i> (Ascochyta) <i>Fusarium</i> spp. and <i>Rhizoctonia solani</i> and <i>Pythium</i>		260 - 330- mL
Soybeans	Seed rot and seedling blight caused by <i>Phomopsis</i> spp., <i>Rhizoctonia solani</i> and <i>Fusarium</i> spp.		260 mL
Flax (including edible oil flax)	Seed rot, root rot, seedling blight caused by <i>Rhizoctonia solani</i> and <i>Fusarium</i>		525 mL

* The 230 mL rate will give partial control of true loose smut in wheat and barley and stem smut in rye. Use 330 mL rate for the control of seed-borne *Septoria* on wheat and seed rot and seedling blight caused by *Fusarium* spp., *Cochliobolus sativus*, *Pythium* spp., *Penicillium* spp., *Aspergillus* spp., *Alternaria*; also suppression of root rot caused by *Cochliobolus sativus* on cereals (wheat, barley, oats and rye).

** Use a 260 mL rate for control of *Rhizoctonia solani* and *Fusarium* spp. Use a 330 mL rate for control of *Mycosphaerella pinodes* (Ascochyta).

*** Avoid planting corn under cold, wet conditions. Stress conditions during the first few weeks after planting may increase the incidence of head smut. Will not control soil-borne head smut.

Vitaflo 280 (cont'd)**Bushels Treated**

Container size	Barley*	Oats**	Wheat***	Lentils/peas***
10 L	202 (low rate); 139 (high rate)	197	161 (low rate); 111 (high rate)	111
200 L drum	3,985 (low rate); 2,778 (high rate)	3,921	3,190 (low rate); 2,222 (high rate)	2,222

* Based on 48 lbs/bushels, ** based on oats at 34 lbs/bushels, *** based on wheat at 60 lbs/bushels

Application Tips

Treat only clean seed of known quality that is free of debris and dust. Uniform coverage is critical to obtain optimum results; uneven seed coverage may not give the desired level of disease control. Consult manufacturer's label or recommendations with regard to the use of Vitaflo 280 and rhizobia inoculants.

How it Works

Thiram is a fungicide that controls diseases carried on the seed. Carbathiin is a systemic fungicide that penetrates the seed coat to control diseases inside the seed and seedling.

Restrictions

Grazing: Do not graze or feed livestock on treated areas for 4 weeks after planting except for the following crops: Soybeans – Do not graze or feed livestock on forage and hay on treated areas. Dry beans – Do not graze or feed on bean forage for 60 days after planting. Barley, oats, wheat – Do not graze or feed on treated area for six weeks after planting. Do not use treated seed for food, feed or oil processing.

Environmental Precautions

Do not contaminate ponds, lakes or streams.

Toxicity

Thiram: Ingestion: Moderately toxic. Acute Oral LD₅₀ (rat) = 2,600 mg/kg. **Dermal:** Slightly toxic. Acute LD₅₀ (rabbit) = > 2,000 mg/kg.

Carbathiin: Ingestion: Moderately toxic. Acute Oral LD₅₀ (rat) = 2,900 mg/kg. **Dermal:** Non-toxic. Acute LD₅₀ (rabbit) = > 4,000 mg/kg

Storage

Do not store Vitaflo 280 in direct sunlight. Do not store Vitaflo 280 at temperatures above 35°C. Vitaflo 280 will not freeze solid even in extreme winter temperatures. If containers of Vitaflo have been in storage for several months, some settling may occur and require agitation; 10L containers can be shaken and drums (200L) turned upside down for ½ hour and then rolled back and forth several times.

Foliar Fungicide Index

Name	Page/s
Chemical Control of Plant Diseases in Alberta ...	380
Introduction	380
Chemical control of disease	380
Fungicide - Foliar Treatment Selector Chart.....	381

Foliar Treatment

Acrobat 50 WP	385
Allegro 500F	386
Astound.....	387
azoxystrobin	410
azoxystrobin + propiconazole	412
Bacillus subtilis	422
boscalid	404
boscalid + pyraclostrobin.....	399
Bravo 500	388
Bumper 418 EC.....	426
Caramba	390
chlorothalonil	388
chlorothalonil + metalaxyl	416
coniothyrium minitans.....	391
Contans WG	391
copper.....	372
Coppercide WP	392
copper hydroxide.....	392
Copper 53W	392
Copper Spray	392
Curzate 60 DF.....	394
cyazofamid	413
cymoxanil	394
cyprodinil	387
dimethomorph	385
Dithane DG 75	395
Echo 720	388
Echo 90 DF	388
famoxadone + cymoxanil.....	424
fenamidone.....	414
fluzazinam	386
Folicur 432 F/250 EW	397
Gavel 75 DF	398
Headline Duo	399
Headline EC.....	400
iprodione	419
Kocide 2000	392

Name	Page/s
Kumulus DF	403
Lance	404
mancozeb.....	395
mancozeb + zoxamide	398
mandipropamid	415
Manzate 200, 75DF, Pro-stick.....	395
metalaxyl + mancozeb.....	418
metconazole	390
metiram.....	406
Parasol	392
Penncozeb 75DF, 80WP	395
Pivot 418 EC	426
Polymar DF	406
Proline 480	407
propamocarbhydrochloride + chlorothalonil	425
propiconazole	426
prothioconazole	407
prothiconazole + tebuconazole.....	409
Prosaro 250 EC	409
pyraclostrobin	400
pyrimethanil	420
Quadris	410
Quilt.....	412
Ranman	413
Reason 500 SC.....	414
Revus	415
Ridomil Gold/Bravo Twin-Pak.....	416
Ridomil Gold MZ 68WP	418
Rovral Flo.....	419
Rovral RX.....	419
Scala	420
Senator 70WP	421
Serenade ASO	422
Stratego 250 EC	423
sulphur	403
Tanos 50 DF	424
Tattoo C	425
tebuconazole	397
thiophanate methyl.....	421
Tilt 250E	426
trifloxystrobin + propiconazole	423

Chemical Control of Plant Diseases in Alberta

Introduction

Plants, like other living organisms, are attacked by many diseases that are caused by fungi, bacteria, viruses, mycoplasmas and nematodes. The management of plant diseases is based on four general parameters:

- **Exclusion** (quarantine) a disease organism or diseased plant material from entering a country or disease-free area where the disease could become established.
- **Protection** that includes management practices such as proper sanitation, chemical controls, adequate soil nutrient levels and good soil drainage can be used to protect plants from disease organisms.
- **Eradication** involving the use of crop rotations or the application of chemicals such as fungicides.
- **Plant breeding** that results in the development of crop plants that have partial or complete resistance to a specific disease or range of infectious diseases.

Chemical control of disease

In Alberta, fungal diseases of some field crops may be subject to direct chemical control by fungicides. Control of most other field crop diseases relies on alternate methods. Currently, the major use of fungicides is in the treatment of seeds (cereal, forage, oilseed), potato seed pieces and the control of foliar disease.

At present, foliar fungicides are registered for a number of significant foliar diseases including the following: Sclerotinia white mould, alternaria black spot and blackleg control in canola, cereal leaf diseases, foliar diseases of potatoes, field beans and lentils.

Fungicide – Foliar Treatment Selector Chart

Barley, Wheat, Oats and Rye

Crop	Barley								Wheat								Oats								Rye	
Products	Bumper/Pivot/Tilt	Caramba	Folicur 432 F/250 EW	Headline EC	Proline 480 SC	Prosaro	Quilt	Stratego	Bravo 500	Bumper/Pivot/Tilt	Caramba	Mancozeb –based products*	Folicur 432 F/250 EW	Headline EC	Proline 480 EC	Prosaro	Quilt	Stratego 250 EC	Bumper/Pivot/Tilt	Caramba	Headline	Folicur 432 F/250 EW	Stratego 250 EC	Headline EC	Caramba	
Fusarium head blight		S			S	S			S		S		S		S	S									S	
Leaf rust	C		C			C	C			C	C	C	C	C	C	C	C	C			S				C	
Glume blotch									C	C						C	C									
Net blotch	C		C	C	C	C	C	C																		
Powdery mildew	C		C			C				C			C	C		C		C							C	
Scald	C		C	C	C	C	C	C																		
Septoria leaf spot	C						C		C	C	C			C			C							C		
Septoria leaf blotch			C			C		C				C			C	C		C	C							
Spot blotch	C		C	C	C	C		C					C	C												
Stem rust	C		C			C				C			C			C		C					C			
Stripe rust			C	C		C	C			C			C	C		C	C	C								
Tan spot									C	C	C	C	C	C	C	C	C	C								
Crown rust																			C		C	C	C	C		

C = Control, S = Suppression

*Mancozeb-based products are Dithane DG 75, Manzate 200, Manzate 75 DF, Manzate Pro-stick, Pencozeb 75 DF, Pencozeb 80 WP

Canola, Mustard and Flax

Crop	Canola								Mustard		Flax	
Products	Astound	Bumper/Pivot/Tilt	Contans WG	Headline EC	Lance	Proline 480 SC	Quadrif	Royal Flo/ Royal RX	Seranade ASO	Proline 480 SC	Headline EC	Proline 480 SC
Alternaria black spot				C	C		C	C				
Blackleg		C		C			C					
Pasmo											C	
Sclerotinia white mould	C	C		C	C	C	C	C	C	C		C

Fungicide - Foliar Treatment Selector Chart

Pulse Crops

Crop	Beans										Lentils/Chickpeas										Peas									
	Products										Products										Products									
	Bumper/Pivot/Tilt	Copper 53 W	Headline EC	Lance	Quadris	Quilt	Serenade ASO	Senator 70 WP	Contras WG	Allaegro	Headline DUO	Headline EC	Proline 480 SC	Quadris	Quilt	Bravo 500	Bumper/Pivot/Tilt	Lance	Serenade ASO	Mancozeb-based products****	Bravo 500	Bumper/Pivot/Tilt	Headline EC	Kumulus DF	Lance	Quadris	Quilt	Serenade ASO		
Asian soybean rust					C	C								C	C		C						C	C			C	C		
Anthracnose		C	C		C							C*		C*	C*	C*				C										
Aschochyta blight					C						C**	C*	C	C		C		C		C*	C					C	C			
Bacterial blight		C																												
Botrytis gray mould							C									C		C	C							C			C	
Mycosphaerella blight			C		C																		C			C	C			
Powdery mildew	C		C		C	C									C*		C						C	C	C		C	C		
Downy mildew		C																												
Rust	C		C											C																
Sclerotinia white mould				C			C	C	C	C									C	C									C	

* Only in lentils

** Only in chickpeas

*** Registered products include: Dithane DG, Manzate DF, Manzate Pro-stick, Pencozeb 75 DF

C= Control, S= Suppression

Fungicide – Foliar Treatment Selector Chart

Potatoes

Products	Acrobat WP*	Allegro 500 F	Bravo 500	Copper-based products**	Curzate 60 DF*	Gavel 75 DF	Headline EC	Lance	Mancozeb-based products***	Polyram DF	Quadrif	Ranman 400 SC	Reason 500 SC	Revus	Ridomil Gold/ Bravo	Ridomil Gold MZ/68WP	Scala SC*	Serenade ASO	Tanos 50 DF	Tattoo C
Botrytis gray mould			C												C					
Early blight			C	C		C	C	C	C	C	C		C*		C	C	C*	C	C	
Late blight	C	C	C	C	C*	C	C	C	C	C	C	C	C*	C	C	C			C	C
Late blight tuber rot															C	C				
Pythium leak															S					
Pink rot															S					
Silver scurf										C										

* Must not be used alone. Use only as a tank mixture.

** Copper-based products are: Copper 53 W, Copper Spray, Kocide 2000 and Parasol

*** Mancozeb-based products are Dithane DG Rainshield NT, Manzate DF, Manzate Pro Stick, Cerexaagri

C = Control, S = Suppression

Fungicide - Foliar Treatment Selector Chart

Corn, Alfalfa (grown for seed), Grasses (grown for seed) and Sugar Beets

Products	Crop Corn					Alfalfa				Grasses		Sugar beet				
	Bravo 500	Bumper/Pivot/Tilt	Headline EC	Quadris	Quilt	Headline EC	Lance	Mancozeb -based products*	Rovral Flo/Rovral RX	Headline EC	Headline EC	Mancozeb -based products**	Polyram DF	Caramba	Senator 70 WP	Copper based products***
Northern leaf blight		C			C											
Rusts	C	C	C	C	C											
Gray leaf spot			C		C											
Eye spot	C				C											
Common leaf spot						C	C	C								
Spring black stem/leaf spot							C	C								
Sclerotinia									C							
Leaf rust and stem rust										C						
Powdery mildew										C		C				
Cercospora leaf spot												C	C	C	C	C

C = Control

* Registered products include: Dithane DG 75, Manzate 75 DF, Manzate Pro-stick, Pencozeb 75 DG

** Registered products include: Dithane DG, Manzate DF, Manzate Pro-stick, Pencozeb 80 WP

*** Registered copper based products include: Coppercide WP, Parasol WG, Parasol WP

Acrobat 50 WP

Group 40

Formulation

Product	Company	Active ingredient	Formulation	Container size
Acrobat 50 WP (PCP # 27700)	BASF Canada	Dimethomorph: 50 %	Wettable powder	8 x 1.82 kg

Crops, Diseases Controlled, Rates and Staging

Crop	Diseases	Rate per acre	Staging
Potatoes	Late blight, reduction of tuber blight caused by <i>Phytophthora infestans</i>	182 g	Make the first application when disease threatens or when first visible signs of disease occur within the field or nearby. Apply every 5 - 7 days under high disease pressure or every 7 - 10 days under low disease pressure.

Registered Tank Mixes

Do not apply Acrobat alone. Apply Acrobat 50 WP in a tank mix with Polyram DF or Dithane DG Rainshield or Bravo 500 at the recommended product label rate. Refer to the respective tank-mix partner labeling for additional recommendations, restrictions and precautions. Follow the most restrictive application directions for each of the tank mix partners with respect to the maximum number of applications, application timing and pre-harvest intervals.

Application Information

How to Apply: Ground equipment or by air.

Water Volume: Ground applications: 80 L/acre. Aerial: minimum 20 L/acre.

Application Tips

It is recommended to apply Acrobat 50 WP in alternation with a fungicide having a different mode of action. Under high level of late blight infection, apply this product after topkill to reduce tuber blight.

How it Works

Acrobat 50 WP has protectant, systemic and anti-sporulant activity. Dimethomorph penetrates the plant and moves upward to protect the leaves and stems.

Restrictions

Effects of Rainfall: Do not apply if rain is likely within 2 to 3 hours of spraying and apply to dry foliage.

Pre-harvest Interval: Do not apply Acrobat 50 WP within 4 days of harvest.

Maximum Allowable Applications: Do not apply more than 3 applications per season.

Re-cropping: Do not plant a new crop in the treated area within 120 days of the last application.

Environmental Precautions

Acrobat tank-mix combinations are toxic to fish and other aquatic organisms. Do not apply within 100 m of streams, ponds, rivers and lakes when applying by air and within 50 m when applying by ground.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity

Ingestion: Slightly toxic. Acute oral LD₅₀ (male rat) = 2,939 mg/kg. **Dermal:** Slightly toxic. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store under cool and dry conditions in secure, well ventilated buildings.

Allegro 500 F



Caution Poison

Group 29

Formulation

Product	Company	Active ingredient	Formulation	Container size
Allegro 500 F (PCP # 27517)	Syngenta Crop Protection	Fluazinam: 40.0%	Liquid	2 x 10 L

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre	Staging and comments
Dry shelled beans	White mold	0.4 L	Begin application when plants are at early to mid bloom (10 to 50% bloom), and make one more application 7-10 days later.
Potato	Late blight	0.16 L	Begin applications when the plants are 15 to 20 cm tall or when conditions favour disease development. Repeat application at intervals of 7 to 10 days. Do not apply more than the maximum seasonal use rate of 1.6 L per acre during each growing season. Do not make more than 3 sequential applications per season before alternating to a fungicide with a different mode of action.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with: Ground equipment only. Do not apply by air.

Water volume: 80 - 240 L/acre.

Application Tips

Optimum disease control is achieved when timing of application is based on environmental factors that favour disease development. For potatoes, do not exceed 10 applications during each growing season. For edible beans, do not exceed 2 applications during each growing season.

How It Works

Fluazinam is a pyridinamine fungicide with protective (contact) activity.

Restrictions:

Pre-harvest Intervals: Dry shelled beans - 30 days. Potatoes - 14 days.

Re-cropping: Areas treated with Allegro 500 F may be replanted with potatoes and dry shelled beans as soon as practical after the last application. Other root crops and leafy vegetables can be planted 30 days after the last application. All other crops can be planted 70 days after the last application.

Re-entry: Do not enter or allow workers entry into treated areas during the restricted re-entry interval of 24 hours.

Environmental Precautions

Allegro is toxic to aquatic organisms, non-target terrestrial plants and wild mammals. Observe buffer zones specified on the product label.

Toxicity

Ingestion: Acute oral LD₅₀ (rats) = >5,000 mg/kg. **Dermal:** Slightly toxic. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store in a cool, dry storage area separate from feed, fertilizer or food.

Astound

Group 9, 12

Formulation

Product	Company	Active ingredient	Formulation	Container size
Astound (PCP# 29648)	Syngenta Crop Protection	Cyprodinil, Fluidioxonil	62.5% Wettable granule	2 x 6.28 kg

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre	Staging and comments
Canola	Sclerotinia stem rot (<i>Sclerotinia sclerotiorum</i>)	310-390 g	Apply at 20 - 40% bloom stage. Use higher rate under conditions of high disease pressure.

Registered Tank Mixes

Matador.

Application Information

How to Apply: Apply with ground equipment or by air.

Water Volume: Ground: minimum of 80 L/ac. Air: minimum of 18 L/ac.

Application Tips

Thorough coverage is necessary to provide disease control. Applications using sufficient water volume to provide thorough and uniform coverage generally provide disease control. If pump or nozzle screens must be used, ensure they are 50 mesh or coarser. Do not apply more than 2 consecutive applications of Astound fungicide or other fungicides in the same grow in a season.

How It Works

Group 9 and Group 12 chemistry offer a resistance management option for control of sclerotinia. Astound works systemically and on contact to provide both preventative and curative protection from sclerotinia.

Restrictions

Rainfall: Avoid application when rain is forecast.

Pre-harvest interval: Do not apply within 35 days of harvest.

Re-cropping restrictions: Do not plant any other crop for a period of 30 days after harvest or crop failure unless Astound is registered for that use.

Environmental Precautions

Astound is toxic to aquatic organisms. Observe buffer zones specified on the label. Do not contaminate irrigation or drinking water supplies or aquatic habitats when cleaning equipment or disposing of wastes. Do not apply this product through any type of irrigation system.

Toxicity

Ingestion: Practically non-toxic. Acute oral LD₅₀ (male rat) > 5,000 mg/kg. **Dermal:** Slightly toxic. Acute dermal LD₅₀ (rabbit) > 2000 mg/kg.

Storage

Store in a dry place.

Bravo 500/Echo 720/ Echo 90 DF

Warning: Causes Severe Eye Damage

Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Bravo 500 WP (PCP # 15723)	Syngenta Crop Protection	Chlorothalonil: 500 g/L	Suspension	2 X10 L, 200 L
Echo 720 (PCP # 29355)	Sipcam Agro/UAP Canada	Chlorothalonil: 720 g/L	Suspension	2 x 10L, 450 L
Echo 90 DF (PCP # 29356)	Sipcam Agro/UAP Canada	Chlorothalonil: 90%	Dry flowable	10 kg

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases controlled	Rate per acre			Staging and comments
		Bravo 500	Echo 720	Echo 90DF	
Corn (sweet)	Common rust	1.29 L	0.90 L	NR*	Apply when symptoms are first noticed and repeat again 10 - 14 days later. Do not make more than 2 applications per season. Do not apply within 14 days of harvest.
Chickpea	Ascochyta blight	1.2 - 1.6 L in first application and 0.8 - 1.2 L in subsequent applications	0.85 - 1.13 L for first application and 0.56-0.85 L in subsequent applications	NR	Make first application at very early flowering and remaining applications at 10-day intervals. Do not make more than three applications per season. Do not apply within 14 days of harvest. Ground applications only.
Dry peas	Ascochyta blight (<i>Mycosphaella pinodes</i>)	0.8 - 1.2 L	0.56 - 0.85 L	NR	Apply beginning at early flowering. Make a second application at early pod set, around 10 days after the first. Always apply the higher rate when conditions are favourable for disease. If conditions remain favourable for disease, a third application should be made 10 to 14 days later during pod filling. Do not make more than three applications per season. Do not apply within 32 days of harvest.
Lentils	Ascochyta blight Anthracnose	0.8 - 1.6 L	0.56 - 1.13 L	NR	Apply beginning at pre-flowering prior to row closure; make a second application 10 to 14 days after the first application (during bloom period). Do not make more than two applications per season. Do not apply within 48 days of harvest.

Crops	Diseases controlled	Rate per acre			Staging and comments
		Bravo 500	Echo 720	Echo 90DF	
Potato	Late blight	0.48 - 1.0 L	0.32 - 0.69 L	0.28 - 0.52 kg	Begin applications when plants are 15 - 20 cm high, or when disease threatens. Repeat applications as necessary to maintain disease control. Under severe disease conditions, use the higher rates at 7-day intervals. Do not apply to potato plants later than 1 day before harvest.
	Early blight, Botrytis vine rot	0.64 - 1.0 L	0.45 L	0.36 - 0.52 kg	
Wheat	Septoria leafspot, septoria glume blotch and tan spot	0.6 - 1.0 L	0.4 - 0.69 L	NR	Apply at flag leaf emergence and repeat 10 - 14 days later when head is visible. A third application, head fully emerged, may be necessary if conditions favour disease spread. Do not make more than 3 applications per season. Do not apply within 30 days of harvest
	Fusarium head blight (scab) suppression	0.8 - 1.0 L	0.56 - 0.69 L	NR	Apply at early flowering. For best results make application prior to conditions that favour infection (before flowering has started in the majority of tillers and wet weather is due). Do not make more than 3 applications per season. Do not apply within 30 days of harvest

NR* = Not registered

Registered Tank Mixes

For Bravo 500 only.

Tank-mix partner	Tank-mix rate	Additional diseases controlled	Specific comments
In potatoes only			
Quadris Flowable	Bravo 500 at 0.8 L/acre PLUS Quadris Flowable at 0.202 L/acre	Early blight	Apply on a 7 to 14 day interval, starting prior to disease development. Do not exceed more than 3 applications per season. Do not apply to potato plants later than 2 days before harvest.

Application Information**How to Apply:** Apply with ground equipment or by air.**Water Volume:** Ground application: 90 - 650 L/acre for diluted sprays and 20 - 40 L/acre for concentrated sprays.**Air:** 20-40 L/acre.**Application Tips**

Through uniform coverage is essential for disease control.

How it Works

A contact and protectant fungicide.

Restrictions**Effects of Rainfall:** Bravo is rainfast once the spray solution has dried on the plant surface.**Pre-harvest Intervals (days):** Chickpeas (14), lentils (48), field peas (32), potatoes (1), wheat (30).

Bravo 500/Echo 720/Echo 90 DF (cont'd)

Grazing: Do not feed the hay from treated crop to livestock. Do not allow grazing of treated crop.

Re-entry: Do not re-enter treated areas within 48 hours.

Environmental Precautions

Bravo 500 is toxic to fish, aquatic invertebrates and marine/estuarine organisms. Runoff from treated areas may be hazardous to aquatic organisms in neighbouring areas. Do not apply directly to water. Do not apply where runoff is likely to occur. Do not apply when weather conditions favour drift from areas being treated. Observe a buffer zone of 100 metres for aerial applications and 15 metres for ground applications to protect aquatic habitats.

Toxicity

Ingestion: Acute oral LD₅₀ (rat) = 4,200 mg/kg. **Dermal:** Acute dermal LD₅₀ (rat) = > 20,000 mg/kg.

Storage

Do not store near feed or foodstuffs. Store in a cool place.

Caramba

Group 3**Formulation**

Product	Company	Active ingredient	Formulation	Container size
Caramba	BASF	Metconazole 90 g/L	Emulsifiable concentrate	8.1 L jug, 128 L drum

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre (mL)	Staging and comments
Wheat	Leaf rust, tan spot, <i>Septoria</i> leaf spot	202 - 283	Prior to disease development or at onset of disease.
	Suppression of <i>Fusarium</i> head blight	405	Prior to disease development or at onset of disease. Product applied when crop is 20% flowering.
Barley	Suppression of <i>Fusarium</i> head blight	405	Prior to disease development or at onset of disease. Application between full head emergence and up to 3 days after full emergence of main stem heads.
Oats	Suppression of <i>Fusarium</i> head blight	405	Prior to disease development or at onset of disease. Product applied when crop is 20% flowering.
Rye	Suppression of <i>Fusarium</i> head blight	405	Prior to disease development or at onset of disease. Product applied when crop is 20% flowering.
Soybeans	Asian soybean rust	283	Initial application between early flowering and pod set or prior to disease development.
Sugar beets	<i>Cercospora</i> leaf spot	405 - 506	Prior to disease development or at onset of disease.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Ground equipment or by air.

Water Volume: Ground applications: 40 L/acre. Aerial: 20 L/acre.

Nozzles: Consult nozzle manufacturers for specific nozzle recommendations.

Application Tips

Leaf diseases: Thorough coverage is essential to protect target plants from disease development.

Fusarium Head Blight: Timing of application is critical. For optimum suppression of Fusarium head blight, apply Caramba when 75% of the heads for wheat, oats and rye are fully emerged to when 50% of the heads on the main stem are in flower. For barley, apply between full head emergence and up to 3 days after full emergence of main stem heads.

How It Works

The active ingredient metconazole is a broad spectrum sterol biosynthesis inhibitor fungicide. Caramba is best utilized as a preventative application when environmental conditions are favourable for disease development.

Restrictions

Pre-harvest Intervals: Wheat, barley, oats and rye: 30 days; soybeans: 30 days and sugar beets 14 days.

Re-cropping: A plant-back interval of 35 days is required for all crops not listed on the label.

Re-entry: After application, a re-entry interval of 5 days exists for wheat, barley and oats; 4 days for soybean; 9 days for sugar beets.

Rainfall: Rainfast in 1 hour. Avoid application if heavy rain is forecast.

Grazing: All crops can be grazed or fed to livestock.

Environmental Precautions

Toxic to aquatic organisms, non-target terrestrial plants and small wild animals. Avoid runoff from treated areas into aquatic areas.

Toxicity

Acute oral LD₅₀ (female rat) = 2102 mg/kg. Acute dermal LD₅₀ (rat) = > 4,000 mg/kg.

Storage

Store in original container. Protect from freezing.

Contans WG

Bio fungicide

Formulation

Product	Company	Active ingredient	Formulation	Container size
Contans WG (PCP# 29066)	U.A.P.	Coniothyrium minitans 1 x 10 ⁹ CFU/g	Water dispersable granules	20 kg

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre (kg)	Timing and specific comments
Canola, sunflower, dry edible beans, soybeans	<i>Sclerotinia</i> stem rot	Pre-plant application 0.4 – 0.8	Apply to soil prior to or at time of planting. Product should be incorporated thoroughly and uniformly using appropriate equipment. Ideal depth of incorporation is 5 cm. Product should be applied at least three months prior to the onset of <i>Sclerotinia</i> disease.
	<i>Sclerotinia sclerotiorum</i>	Postharvest application 0.2 – 0.4	Apply Contans WG to harvest residues. Once product is applied, the treated residues must be incorporated into the upper soil layer (top 5 cm of soil).

Contans WG (cont'd)

Application Information

How to Apply: Ground equipment only. Do not apply by air.

Water Volume: Thorough coverage of the soil is required for optimum disease control.

Application Tips

After incorporation, treated soils should not be disturbed (e.g. plowed) to avoid bringing untreated sclerotia from lower soil depths to the top soil layer.

How it Works

When applied correctly, the active ingredient in Contans WG will destroy sclerotia in the soil before the sclerotia are able to produce fruiting bodies.

Restrictions

Pre-harvest Interval: Contans WG can be applied up to and including the day of harvest.

Environmental Precautions

Do not apply this product directly to freshwater habitats. Do not contaminate irrigation or drinking water supplies by cleaning of equipment or disposal of wastes.

Toxicity

Acute oral LD₅₀ (rat) > 2500 mg/kg. Acute dermal LD₅₀ (rat) = > 2,500 mg/kg.

Storage

Store in a dry area in original container. Maximum storage period of one year at temperatures of 4°C or up to 6 weeks at temperatures between 4 and 23°C.

Copper 53 W/Copper Spray/Coppercide WP/Kocide 2000/ Parasol WG/Parasol WP/ Parasol Flowable



Warning Poison

Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Copper 53 W (PCP # 09934)	United Agri Products	Tribasic Copper sulphate: 53%	Wettable powder	10 kg
Copper Spray (PCP # 19146)	United Agri Products	Copper oxychloride: 50%	Wettable powder	2 x 10 kg
Coppercide WP (PCP # 16047)	United Agri Products	Copper oxychloride: 50%	Wettable powder	
Kocide 2000 (PCP # 27348)	E. I. duPont	Copper hydroxide: 53%	Dry flowable	10 kg
Parasol WG (PCP # 29063)	Nufarm Agriculture Inc.	Copper hydroxide: 50%	Wettable granules	10 kg
Parasol WP (PCP # 24671)	Nufarm Agriculture Inc.	Copper hydroxide: 50%	Wettable powder	10 Kg
Parasol Flowable (PCP # 25901)	Nufarm Agriculture Inc.	Copper hydroxide: 24.4%	Flowable	10 L

**Copper 53 W/CopperSpray/Coppercide WP/Kocide 2000/Parasol WG/Parasol WP/
Parasol Flowable (cont'd)**

Crops, Diseases Controlled and Rates

Products	Registered crops	Diseases controlled	Rate (kg/acre)	Staging
Copper 53 W	Beans	Anthracnose, downy mildew, bacterial leaf spot	2.2	Apply as needed to keep the plants covered.
	Potato	Early and late blight	2.2	Apply when plants are 12 to 18 cm high. Repeat at 7 to 10 day intervals.
Copper Spray	Potato	Early and late blight	1.61	Apply when plants are 10 to 20 cm high. Repeat at 7 to 10 day intervals.
Coppercide WP	Beans	Bacterial blight (Halo & Common)	0.9 - 1.3	Apply when plants are 15 cm tall.
	Potato	Early and late blight	0.45 - 0.91	Apply when plants are 15 cm high.
	Sugar beet	Cercospora leaf spot	0.91-1.3	Apply when disease threatens and continue for 4 to 5 applications.
Kocide 2000	Beans	Bacterial blight (Halo & Common)	0.65 - 0.93	Apply when plants are 15 cm tall.
	Potato	Early and late blight	0.32 - 0.64 0.96 (vine kill)	Apply when plants are 15 cm high. Repeat at 7 to 10 day intervals.
Parasol WG	Beans	Bacterial blight (Halo & common)	0.91 - 1.32	Apply when plants are 15 cm tall. Repeat at 7 to 14 days intervals.
	Potato	Early and late blight	0.45 - 1.01 1.38 (vine kill)	Apply when plants are 12 to 18 cm high. Repeat at 7 to 10 day intervals.
	Sugar beet	Cercospora leaf spot	0.91 - 1.82	Apply when disease threatens and continue for 4 to 5 applications.
Parasol WP	Beans	Bacterial blight (Halo & common)	0.91 - 1.32	Apply when plants are 15 cm tall. Repeat at 7 to 14 days intervals.
	Potatoes	Early and late blight	0.45 - 1.01 1.38 (vine kill)	Apply when plants are 12 to 18 cm high. Repeat at 7 to 10 day intervals.
	Sugar beet	Cercospora Leaf Spot	0.91 - 1.82	Start spray when disease threatens and continue for 4 to 5 applications.
Products	Registered crops	Diseases controlled	Rate (L/acre)	Staging
Parasol Flowable	Beans	Bacterial blight (Halo & common)	0.93 - 1.26	Apply when plants are 15 cm tall. Repeat at 7 to 14 days intervals.
	Potatoes	Early and late blight	0.32 - 0.73 0.97 (vine kill)	Apply when plants are 12 to 18 cm high. Repeat at 7 to 10 day intervals.

Registered Tank Mixes

Kocide 2000: Manzate DF or Manzate Pro-Stick in potato crops.

Application Information

How to Apply: With: Ground equipment only. Do not apply by air.

Water Volume: Copper 53 W/Copper Spray - 404 L/ac.

Kocide 2000, Parasol WG/Parasol WP/Parasol.

Flowable – Use sufficient water to obtain adequate spray coverage.

Application Tips

In potatoes, Kocide 2000 and Parasol WG may be applied with a desiccant at vine kill or alone after vine kill, prior to harvest to reduce the risk of late blight infection.

How it Works

Copper hydroxide, copper oxychloride and copper sulphate are contact fungicides.

Copper 53 W/CopperSpray/Coppercide WP/Kocide 2000/Parasol WG/Parasol WP/Parasol Flowable (cont'd)

Restrictions

Pre-harvest Interval: Do not apply to crops within 1 day of harvest.

Environmental Precautions

Copper-based fungicides are toxic to fish and other aquatic organisms. Keep out of any body of water; fish may be killed.

Toxicity

Copper-based fungicides have a low to high mammalian toxicity. Copper hydroxide: Acute oral LD₅₀ (rat) = 1,000 - 2,000 mg/kg. Copper oxychloride: Acute oral LD₅₀ (rat) = 1,470 mg/kg. Copper sulphate: Acute oral LD₅₀ (rat) = 30 mg/kg.

Storage

Store in a cool, dry, ventilated place, away from feeds and foods.



Danger Poison

Curzate 60 DF

Group 27

Formulation

Product	Company	Active ingredient	Formulation	Container size
Curzate 60 DF (PCP # 26284)	E.I. duPont Canada	Cymoxanil 60%	Dry Flowable	1.8 kg

Crops, Diseases Controlled and Rates

Crops	Diseases controlled	Rate	Staging and specific comments
Potatoes	Late blight (<i>Phytophthora infestans</i>)	Curzate: 0.09 kg/acre Plus Manzate DF 0.55 - 0.65 kg/acre	Initial applications should start when local conditions indicate that late blight is imminent. Make additional applications at 5 - 7 day intervals. Apply no more than 7 applications per crop. Use higher rate of Manzate DF under conditions of high disease pressures.

Registered Tank Mixes

Manzate 200 DF.

Application Information

How to Apply: With: Ground sprayers only. Do not apply by air.

Water Volume: 80 - 400 L/ac.

Application Tips

Caution: Use Curzate 60 DF only in a tank mix with Manzate DF. Do not use Curzate 60 DF alone.

Do not apply to a potato crop that is suffering from stress as a result of drought, water saturation, low temperatures, insect infestations, nutrient deficiency or any other factors contributing to a reduction in crop growth.

How it Works

The active ingredient cymoxanil in Curzate 60 DF is a highly active, locally systemic fungicide recommended for the control of late blight on potatoes. It works as a preventative, curative and inhibitive (against sporulation) product. Curzate offers a unique feature for late blight management called "kick-back" activity. It controls infections that have already attacked the crop but are not yet visible.

Restrictions

Rainfall: Curzate is rainfast within 2 hours after application.

Pre-harvest Intervals: Do not harvest within 8 days of treatment.

Re-entry: Do not re-enter treated area within 24 hours.

Environmental Precautions

Overspray or drift to sensitive habitats must be avoided. A buffer zone of 50 metres is required between the downwind point of direct application and the closest edge of sensitive aquatic habitats. Do not contaminate sensitive habitats when cleaning and rinsing spray equipment and containers. Do not mix, load or apply within 15 metres of all wells.

Runoff: Do not apply product during periods of intense rainfall or to soils saturated with water. Do not apply directly to standing or running water. Do not apply in areas where surface water from treatment site can run off to adjacent cropland, either planted or to be planted, or into streams, irrigation waters or wells. Do not contaminate any body of water, including irrigation water.

Toxicity

Curzate 60 DF is moderately toxic after single ingestion. Acute oral LD₅₀ (rat) = 433 mg/kg. Slightly toxic after short-term skin contact. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store product in original container in a secure, dry area away from food or feed. Protect against humid air and water.

Dithane DG 75/Manzate 200/ Manzate 75DF/Manzate Pro-stick/ Penncozeb 75DF/ Penncozeb 80WP



Caution Poison

Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Dithane DG 75 (PCP# 29221)	Dow AgroSciences	Mancozeb: 75%	Dry flowable	20 kg bag
Manzate 200 (PCP# 10526)	United Phosphorus Inc.	Mancozeb: 80%	Wettable Powder	
Manzate DF (PCP# 21057)	United Phosphorus Inc.	Mancozeb: 75%	Dry Flowable	
Manzate Pro-stick (PCP# 28217)	United Phosphorus Inc.	Mancozeb: 75%	Dry Flowable	
Penncozeb 75 DF (PCP# 25397)	UAP	Mancozeb: 75%	Dry Flowable	
Penncozeb 80 WP (PCP# 25396)	UAP	Mancozeb: 80%	Wettable Powder	

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases controlled	Rate	Staging and comments
Alfalfa (for seed) (Dithane DG 75, Manzate 75DF, Manzate Pro-stick, Penncozeb 75DF only)	Leaf spot and stem spot disease	0.59 kg/acre	Apply prior to 50% bloom. Maximum of 3 applications per year.
Lentils (Dithane DG, Manzate DF, Manzate Pro-stick, Penncozeb 75DF only)	Anthrachnose, Ascochyta blight	0.91 kg/acre	Apply the first application before flower when bud formation is evident. A second application should be applied 10 - 12 days after the initial application, but before rows close in to form a dense canopy. If conditions for disease persist, a third application may be applied 10 - 14 days later. Do not make more than 3 applications during the growing season.

**Dithane DG 75/Manzate 200/anzate 75DF/Manzate Pro-stick/Penncozeb 75DF/
Penncozeb 80WP (cont'd)**

Crops	Diseases controlled	Rate	Staging and comments
Potatoes (All mancozeb-based products except Manzate 200)	Early and late blight	0.44 - 0.91 kg/acre	Apply when plants are 10 - 15 cm tall; repeat at 7 - 10 day intervals.
Potatoes (Manzate 200 only)		1 kg per 100 kg of seed	Apply to thoroughly coat the surface of whole or cut seed pieces. If treated whole seed is cut, make a second application to protect the cut surface.
Sugar beet (Dithane DG, Manzate DF, Manzate Pro-Stick, Penncozeb 80 WP only)	Cercospora leaf spot	0.91 kg/acre	Apply when disease first threatens and repeat at 7 - 10 day intervals.
Wheat (All mancozeb-based products)	Leaf rust, Septoria leaf blotch, tan spot	Early spray: 0.45 kg/acre Late spray: 0.91 kg/acre	An early application can be made when the crop is in the 3 leaf to tillering stage and/or a late application can be made when the head is fully emerged but prior to flowering. Do not make more than 2 applications during the growing season.

Registered Tank Mixes

Tank-mix partner	Tank-mix rate	Diseases controlled	Specific comments
Potatoes			
Kocide 2000	Manzate Pro-stick or Manzate DF at 0.44 - 0.91 kg/acre PLUS Kocide 2000 at 0.32 - 0.64 kg/acre.	Early and late blight	Apply at 7 to 10 days intervals starting when plants are 15 cm high until harvest.
Curzate 60 DF	Manzate Pro-stick or Manzate DF at 0.44 - 0.91 kg/acre PLUS Curzate at 0.09 kg/acre.	Late blight	Initial applications should start when local conditions indicate that late blight is imminent. Apply no more than 7 applications per crop.

Application Information

Apply with ground sprayers or by air. Do not apply to sugar beet by air.

Water Volume: Utilize sufficient water to obtain thorough coverage. See label for information on water volumes for specific crops.

Application Tips

Do not apply to a potato crop that is suffering from stress as a result of drought, water saturation, low temperatures, insect infestations, nutrient deficiency or any other factors contributing to a reduction in crop growth. Do not apply product during periods of intense rainfall or to soils saturated with water

How it Works

A contact fungicide.

Restrictions

Grazing: Do not graze the treated crop or cut for hay. Do not use on alfalfa sprout crops for human consumption. Do not use seed crop residue for animal consumption.

Pre-harvest Intervals: Lentils - 35 days. Potatoes - 1 day. Sugar beet - 21 days. Wheat - 40 days.

Environmental Precautions

All Mancozeb-based products are toxic to fish. Do not apply when weather conditions favor drift from areas treated. Do not apply directly to water or to areas where surface water is present. Do not contaminate water by disposing of equipment washwater.

Toxicity

All Mancozeb-based fungicides have very low toxicity by ingestion. Acute oral LD₅₀ (rat) = 5,000 mg/kg. Very low

to slightly toxic by dermal contact. Acute dermal LD₅₀ (rat) = > 2,000 - 5,000 mg/kg.

Storage

Store in a cool, dry, ventilated place away from fire and sparks. Do not allow product to become wet or overheated during storage as chemical changes may reduce fungicidal effectiveness and flammable vapours may be generated.

Folicur 432 F/250 EW

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Folicur 432 F (PCP # 25940)	Bayer CropScience Inc.	Tebuconazole: 432 g/L	Suspension	4.71 L, 9.46 L
Folicur 250 EW (PCP # 29820)	Bayer CropScience Inc.	Tebuconazole: 125 g/L	Emulsion in water	8.1 L

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre		Staging
		Folicur 432 F	Folicur 250 EW	
Wheat	Suppression of Fusarium head blight, control of Septoria glume blotch	118 mL	200 mL	Timing of application is critical. Apply within the time period from when at least 75% of the wheat heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower.
	Rusts (leaf, stem and stripe), Septoria (leaf blotch), tan spot	89 - 118 mL	150 - 200 mL	Apply to leaf foliage at the first sign or very early stage of disease, especially if weather conditions are conducive to disease development, up to the end of the flowering stage.
	Powdery mildew	118 mL	200 mL	
Barley	Net blotch (<i>Pyrenophora teres</i>), spot blotch (<i>Cochliobolus sativus</i>), scald (<i>Rhynchosporium secalis</i>), rusts (leaf, stem and stripe), Septoria leaf blotch (<i>Septoria passerinii</i>), powdery mildew (<i>Erysiphe graminis</i>)	89 - 118 mL	150 - 200 mL	Apply at the very early stage of disease development. Use the higher rate when weather conditions are conducive to heavy disease development.
Oats	Crown rust (<i>Puccinia coronata</i>), stem rust (<i>Puccinia graminis</i>)	89 mL	150 mL	
Soybeans	Control of Asian soybean rust, frog-eye leaf spot and powdery mildew	89-118 mL	150 - 200 mL	Apply when the first symptoms of disease can be found or when the risk of infection is imminent.

Registered Tank Mixes

Folicur 432F can be tank-mixed with certain herbicides for control of early season leaf diseases and weeds on respective labels. Refer to label for registered herbicide products.

Application Information

How to Apply: With: Ground equipment or by air.

Water Volume: Ground: Minimum of 40 L/acre. Air: 20 L/acre.

Application Tips

Spray coverage is essential; ensure thorough coverage of all wheat heads for optimal suppression of Fusarium head

Folicur 432 F/250 EW (cont'd)

blight. Folicur 432 F is recommended for use with Agral 90 or AgSurf at 0.125% v/v.

How it Works

Folicur 432 F/250 EW is a broad-spectrum fungicide for disease control in cereals with preventative, curative and eradivative properties.

Restrictions

Grazing: Do not allow livestock to graze or feed green forage to livestock prior to 6 days after application. Straw cut after harvest may be fed or used for bedding.

Pre-harvest Intervals: Do not apply within 36 days of harvest for wheat, barley and oats. Do not apply within 20 days of harvest for soybeans.

Re-entry: Do not enter treated fields for 12 hours after application.

Maximum Allowable Applications: A maximum of one application per crop season.

Re-cropping: Treated areas may be replanted following harvest with any crop listed on the label. Do not replant treated areas for 120 days after last application for crops not listed on the label.

Environmental Precautions

Tebuconazole is toxic to birds, small wild animals, aquatic organisms and non-target plants. Do not apply directly to water or to areas where surface water is present. Runoff is hazardous to aquatic organisms in neighboring areas. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Do not apply by ground or air within 30 metres of aquatic areas.

Toxicity

Folicur 432 F/250 EW have a low toxicity by ingestion. Acute oral LD₅₀ (rat) = 3,710 mg/kg.

Storage

Store in a cool, dry place and prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container, preferably in a locked storage area.

Gavel 75 DF

Group M, 22

Formulation

Product	Company	Active ingredient	Formulation	Container size
Gavel (PCP # 26842)	Gowan	Mancozeb: 66.7% + Zoxamide: 8.3%	Dry flowable	20 kg bag

Crops, Diseases Controlled, Rates and Timing

Crop	Diseases	Rate	Staging
Potatoes	Early and late blight	0.69 kg/ac	Begin applications at the first sign of disease or when blight is reported in the area. Apply every 7 days under low disease pressure and environmental conditions unfavourable for disease development.
		0.90 kg/ac	Apply every 7 days under high disease pressure when either disease is present or environmental conditions favour continued disease development.

Registered Tank Mixes

None registered.

Application Information

How to Apply: With: Ground sprayers and by air.

Water volume: Ground equipment: 90 L/ac. Air: 18 to 36 L/ac.

Application Tips

Optimum disease control is achieved when the fungicide is applied in a regularly scheduled preventative spray program. Maximum of 6 applications per season. Under high disease pressure, use higher water volume to provide better crop coverage.

How it Works

The active ingredient zoxamide is a benzimidazole-type fungicide with contact activity. The mancozeb component is a dithiocarbamate fungicide with contact activity.

Restrictions

Pre-harvest Intervals: Do not apply within 3 days of harvest.

Re-cropping: A 30-day interval is required before planting leafy vegetables and root and tuber vegetables. For all other crops not included on the label, a 140 day interval is required.

Environmental Precautions

This pesticide is toxic to fish. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. For terrestrial uses, do not apply directly to water and to areas where surface water is present. Do not contaminate water when disposing of equipment washwaters or disposing of wastes. See label for details on buffer zone requirements.

Toxicity

Gavel has a very low toxicity by ingestion. Acute oral LD₅₀ (rat) = 5,000 mg/kg. Very low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Keep away from fire and sparks. Store in a cool, dry, well ventilated area. Do not allow to become wet or overheated in storage: decomposition, impaired activity or fire may result. Keep container closed when not in use.



Caution Poison

Headline DUO

Group 7, 11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Headline DUO One (PCP # 28862)	BASF Canada	Boscalid: 25.2% + Pyraclostrobin: 12.8%	Water dispersible granules	2 x 6.4 kg
Headline DUO Two (PCP # 28863)		Boscalid: 70%		2 x 1.16 kg

Note: Jugs are split internally and contain both Headline Duo One and Headline Duo Two. Each split jug treats 20 ac.

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre	Staging
Chickpeas	Ascochyta blight	Headline DUO must be mixed at the following rates: Headline DUO One at 320 g Plus Headline DUO Two at 58 g	Apply at the beginning of flowering or at the onset of symptoms. Note: Ascochyta blight can develop quickly once established. Early detection is essential.

Registered Tank Mixes

None registered.

Headline DUO (cont'd)**Application Information****How to Apply:** Ground sprayers and by air.**Water volume:** Ground equipment: 40 L/ac. Air: minimum water volume of 20 L/acre.**Application Tips**

Do not apply sequential applications of this tank mixture combination. Alternate to a fungicide with a mode of action other than Group 7 and 11 for at least one application. Do not apply more than 2 applications of Headline DUO per year.

How it Works

The active ingredient pyraclostrobin is a member of the strobilurin class of chemistry, and boscalid belongs to the carboxamide (SDHI) class of chemistry. Headline DUO inhibits spore germination, mycelial growth and sporulation of the fungus on the leaf surface.

Restrictions**Effects of rainfall:** Avoid application when heavy rain is forecast.**Grazing:** All crops can be grazed and fed to livestock.**Pre-harvest interval:** 30 days.

Re-cropping: A plant-back restriction of 14 days is required for all crops not on the label. Note: Boscalid present in Headline DUO is persistent and may carry over. It is recommended that any products containing boscalid not be used in areas treated with this product during the previous season.

Re-entry: Do not enter treated area until 48 hours after application.**Environmental Precautions**

Headline DUO is toxic to aquatic organisms, non-target terrestrial plants and small wild mammals. Observe buffer zones specified on the label.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity

Ingestion: Headline DUO is moderately toxic by ingestion. Acute oral LD_{50} (rat) = 1,490 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD_{50} (rat) = > 2,000 mg/kg.

Storage

Store in a cool, dry, locked, well ventilated area without floor drain.



Danger Poison

Headline EC

Group 11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Headline EC (PCP # 27322)	BASF Canada	Pyraclostrobin: 250 g/L	Emulsifiable concentrate	2 x 6.5 L jug, 104 L tote

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Staging
Cereals			
Wheat	Leaf rust (<i>Puccinia recondita</i>), Septoria leaf spot (<i>Septoria tritici</i> or <i>Leptosphaeria nodorum</i>), tan spot (<i>Pyrenophora tritici-repentis</i>)	0.12 - 0.24 L	Apply immediately after flag stage. Use the higher rate to obtain extended protection with maximum yield benefits. Apply a second time 10 - 14 days later if disease persists or weather conditions are favourable for disease development.
	Powdery mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>), spot blotch (<i>Cochliobolus sativus</i>), stripe rust (<i>Puccinia striiformis</i>)	0.16 - 0.24 L	
Barley	Net blotch (<i>Pyrenophora teres</i>)	0.12 - 0.24 L	
	Scald (<i>Rhynchosporium secalis</i>), spot blotch (<i>Cochliobolus sativus</i>), stripe rust (<i>Puccinia striiformis</i>)	0.16 - 0.24 L	
Corn	Common rust (<i>Puccinia sorghi</i>), gray leaf spot (<i>Cercospora zeae-maydis</i>)	0.16 - 0.24 L	
Oats	Crown rust (<i>Puccinia coronata</i>)	0.16 - 0.24 L	
Rye	Leaf rust (<i>Puccinia recondita</i>)	0.12 - 0.24 L	
	Powdery mildew (<i>Erysiphe graminis</i>)	0.16 - 0.24 L	
Dried and succulent shelled peas, lentils and beans			
Dry beans (<i>Phaseolus</i> , <i>Vigna</i> and <i>Lupinus</i> spp.)	Anthrachnose (<i>Colletotrichum</i> spp.), Mycosphaerella blight (<i>Mycosphaerella</i> spp.), powdery mildew (<i>Erysiphe</i> spp.), rust (<i>Uromyces</i> spp.)	0.16 L	Apply at the beginning of flowering or at the onset of symptoms for the more aggressive diseases (e.g. anthracnose in lentils). Apply a second time 10 - 14 days later if disease persists, or weather conditions are favourable for disease development.
Dry peas (field), Faba beans	Mycosphaerella blight (<i>Mycosphaerella</i> spp.), powdery mildew (<i>Erysiphe</i> spp.)	0.16 L	
	Asian soybean rust (<i>Phakopsora pachyrhizi</i>)	0.16 - 0.24 L	
Lentils	Anthrachnose (<i>Colletotrichum truncatum</i>), Ascochyta blight (<i>Ascochyta</i> spp.)	0.16 L	
Succulent beans and peas (<i>Phaseolus</i> , <i>Vigna</i> and <i>Pisum</i> spp.)	Ascochyta blight (<i>Ascochyta</i> spp.), Mycosphaerella blight (<i>Mycosphaerella</i> spp.), rust (<i>Uromyces</i> spp.), Asian soybean rust (<i>Phakopsora pachyrhizi</i>)	0.16 - 0.24 L	
Chickpeas			
Chickpeas	Ascochyta blight (<i>Ascochyta</i> spp.)	Note: HEADLINE EC must be tank mixed at a rate of 0.16 - 0.24 L/acre with Lance WDG at 0.14 - 0.17 L/acre .	
Flax, soybeans, sugar beets			
Flax	Pasmo (<i>Septorici linicolu</i>)	0.12 - 0.18 L	
Soybeans	Asian soybean rust (<i>phakosporu pachyrhizi</i>) and frog eye leaf spot	0.16 - 0.24 L	
Sugar beets	Cerecospora leaf spot, powdery mildew	0.27 - 0.36 L	

Headline EC (cont'd)

Crops	Diseases	Rate per acre	Staging
Grasses, legumes grown for seed			
Bluegrasses, fescues, ryegrasses	Leaf and stem rust (<i>Puccinia recondita</i> ; <i>P. graminis</i>), powdery mildew (<i>Erysiphe graminis</i>) suppression	0.16 - 0.27 L	Apply prior to disease development and apply a second time 14-21 days later. Use the higher rate and shorter interval when disease pressure is high.
Alfalfa	Common leaf spot	0.16 L	Apply at beginning of flowering (10 - 30% bloom) or the onset of disease. Maximum 1 application per year.
Potatoes			
Potatoes	Early blight (<i>Alternaria solani</i>) (spray interval 7-14 days)	0.18 - 0.27 L	Apply prior to row closure or when conditions become favorable for the development of disease.
	Late blight (<i>Phytophthora infestans</i>) (spray interval 5-7 days)	0.18 - 0.27 L	
	Late blight (<i>Phytophthora infestans</i>) (spray interval 7-10 days)	0.18 - 0.27 L	In a tank mix with Bravo 500 or Polyram DF.
Oilseeds			
Rapeseed, canola, canola quality <i>Brassica juncea</i> , mustard (oilseed and condiment)	Black spot (<i>Alternaria brassicae</i> and <i>A. raphani</i>)	0.12 - 0.16 L	Apply at 20-50% bloom for suppression to early pod stage (90% bloom) for control in canola.
	Black leg (<i>Leptosphaeria maculans</i>)	0.12 - 0.16 L	Apply at the 2-6 leaf stage.
Sunflower	Rust (suppression)	0.12-0.16 L	For optimal disease suppression, apply prior to disease development.

Registered Tank Mixes

Tank mix partner	Crops registered
Lance WDG	Canola
Odyssey WDG	CLEARFIELD canola, CLEARFIELD XCEED
Odyssey DLX	CLEARFIELD canola
Equinox	All canola varieties, CLEARFIELD XCEED
Poast Ultra	All canola varieties
Liberty 150 SN, Liberty 200 SN	LibertyLink canola
Registered glyphosate products	Glyphosate tolerant canola

Note: Consult the label of the tank mix partner for diseases/weeds controlled, rates and timing of applications.

Application Information

How to Apply: Apply with: Ground sprayers or by air.

Water volume: Ground equipment: Minimum of 40 L/ac except for potatoes and sugar beet where a minimum of 80 L/ac is recommended. Air: minimum water volume of 20 L/acre.

Application Tips

Good coverage is essential for effective disease control and higher water volumes tend to increase performance with dense canopies. Headline EC works best if it is applied in a preventative manner and performs best if applied in a regularly scheduled protective spray program. Do not apply more than 2 applications of this tank mixture combination per year.

How it Works

Headline EC has a protective effect because it inhibits spore germination and a curative effect due to the inhibition of mycelial growth and sporulation of the fungus on the leaf surface. Headline is systemic within the leaf. Headline

applied to the top surface of the leaf binds tightly in the waxy cuticle and also moves to the lower surface where it provides dual-sided protection against disease entry.

Restrictions

Effects of rainfall: Avoid application when heavy rain is forecast.

Grazing: Do not graze treated corn crops within 6 days of application. Do not feed alfalfa hay or forage to livestock. All other crops listed can be grazed or fed to livestock.

Pre-harvest interval: Cereals - apply no later than the end of flowering. Corn - 7 days. Edible-podded legumes and succulent beans and peas - 7 days. Grasses (grown for seed) - 14 days. Potatoes - 3 days. Dry bean and field peas, fababeans, and lentils - 30 days. Soybeans, canola, canola quality *Brassica juncea*, mustard (oilseed and condiment), rapeseed - 21 days. Sugarbeets - 7 days.

Re-cropping: A plant-back restriction of 14 days is required for all crops not on the label.

Environmental Precautions

Headline EC is toxic to aquatic organisms, non-target terrestrial plants and small wild mammals. Observe buffer zones specified under Directions for Use on the label.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity

Ingestion: Moderately toxic by ingestion. Acute oral LD₅₀ (rat) = 500 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 4,000 mg/kg.

Storage

Store in a cool, dry, locked, well ventilated area without floor drain.



Danger Poison

Kumulus DF

Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Kumulus DF (PCP # 18836)	BASF Canada	Sulphur: 80%	Water dispersible granules	25 kg bag

Crops, Diseases Controlled, Rates and Staging

Crops	Diseases	Rate per acre	Staging and comments
Field Peas	Powdery mildew	0.6 kg	Spray at first appearance of disease and repeat at 7 - 10 day intervals as necessary.

Registered Tank Mixes

Kumulus DF is compatible with Polyram DF. Do not mix with dinitro compounds, tetradifon or oils.

Application Information

How to Apply: Ground application only.

Ground Applications: Use a minimum water volume of 40 L/acre and ensure thorough coverage of foliage.

Application Tips

Do not apply when rain or night frost is expected. Do not apply if temperature is above 27°C (in shade) and high humidity prevails or if any of the above conditions are expected within 3 days after the treatment. Treat when

Kumulus DF (cont'd)

conditions are such that spray will dry on plants. Do not apply under intense sunshine. Do not apply when weather favours drift. Do not use within 30 days of an oil spray.

How it Works

A contact and protectant fungicide/acaricide.

Restrictions

Pre-harvest Interval: Do not apply later than 1 day before harvest.

Environmental Precautions

Do not apply directly to aquatic habitats. Avoid drift onto neighboring crops.

Toxicity

Ingestion: Kumulus DF has low toxicity by ingestion. Acute oral $LD_{50} = > 2,000$ mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD_{50} (rat) = $> 2,000$ mg/kg.

Storage

Store in cool, dry, well ventilated locked area without a floor drain.

Lance WDG



Caution Poison

Group 7

Formulation

Product	Company	Active ingredient	Formulation	Container size
Lance (PCP # 27495)	BASF	Boscalid: 70%	Wettable granules	2 x 2.83 kg

Crops, Diseases Controlled, Rates and Timing

Crop	Diseases	Rate per acre	Staging and comments
Field crops			
Alfalfa (seed production only)	Blossom blight (<i>Sclerotinia Botrytis cinerea sclerotiorum</i>), common leaf spot (<i>Pseudopeziza medicaginis</i>), spring black stem (<i>Phoma medicaginis</i>), leaf spot (<i>Leptosphaerulina briosiani</i>)	170 g	Apply at 20 - 50% flowering to control blossom blight, common leaf spot and spring black stem. Apply every 7 - 14 days if disease persists or weather conditions are favourable for disease development. Do not make more than 3 applications per season.
Canola, mustard (oilseed types only), CLEARFIELD XCEED	<i>Sclerotinia</i> stem rot (<i>Sclerotinia sclerotiorum</i>) black spot (<i>Alternaria brassicae</i> and <i>raphani</i>)	142 g	Apply at 20-50% flowering to control sclerotinia stem rot and suppress black spot. Apply a second time 7 - 14 days later up to full bloom if disease persists or weather conditions are favourable for disease development. For control of alternaria black spot, apply at late flowering to the early green pod stage. Do not make more than 2 applications per season.
Chickpeas and lentils	<i>Ascochyta</i> blight (<i>Ascochyta</i> spp.), gray mold (<i>Botrytis cinerea</i>), white mold (<i>Sclerotinia sclerotiorum</i>)	170 g	Apply at the beginning of flowering. Apply a second time 7 - 14 days later if disease persists or weather conditions are favourable for disease development. Do not make more than 2 applications per season.

Crop	Diseases	Rate per acre	Staging and comments
Dry beans, faba beans	White mold (<i>Sclerotinia sclerotiorum</i>)	227 - 312 g	Apply at 20-50% flowering. Apply a second time 7 - 14 days later if disease persists or weather conditions are favourable for disease development. Use the higher rate to obtain extended protection and maximum yield benefit. Do not make more than 2 applications per season.
Peas (dry)	Ascochyta blight (<i>Ascochyta</i> spp.) gray mold (<i>Botrytis cinerea</i>), <i>Mycosphaerella</i> blight (<i>Mycosphaerella</i> spp.)	170 g	Apply at the beginning of flowering. Apply a second time 7 - 14 days later if disease persists or weather conditions are favourable for disease development. Do not make more than 2 applications per season.
Potato	Early blight (<i>Alternaria solani</i>)	70 - 126 g	Apply prior to disease development and at 14 days intervals. Do not make more than 4 applications per season.
	Late blight (<i>Phytophthora infestans</i>)	70 - 126 g	Lance must be tank mixed with either Polyram DF or Bravo 500 at label rates for control of late blight. Apply prior to disease development.

** For the control of ascochyta blight in chickpea, Lance should be mixed with 160 to 240 mL/acre Headline EC.

Application Information

How to apply: Apply with: Ground sprayers and by air. Ground Applications: Alfalfa, canola, chickpeas, dry beans, faba beans, dry peas, lentils, potatoes. Air: Alfalfa, dry beans, faba beans, canola, chickpeas, lentils, potatoes.

Pivot or sprinkler irrigation: Alfalfa, canola, dry beans, fababeans, potatoes.

Water volume: Ground application: Minimum of 40 L/ac. For pivot and sprinkler irrigation applications: Do not exceed 0.64 cm (1/4 inch) or 25,700 L/ac. Air application: Minimum of 16 L/ac.

Application Tips

Good coverage is essential for effective disease control. Any reduction in water volume can reduce disease control.

How it Works

Lance provides a protective effect because it inhibits spore germination on plant surfaces. Optimum disease control is achieved when Lance WDG fungicide is applied in a regularly scheduled preventive spray program and is used as a protective application.

Restrictions

Effect of rainfall: Do not apply if rain is likely to occur within 3 hours of spraying. Avoid irrigation for 24 hours after application.

Grazing: For alfalfa grown for seed production: Do not graze or feed treated hay to livestock. All other crops on label can be grazed or fed to livestock.

Pre-harvest Intervals: Canola, chickpeas, dry beans, fababeans, lentil, mustard (oilseed types), peas - 21 days; potatoes - 30 days; succulent beans and peas - 7 days.

Re-entry: Do not re-enter treated area for 12 hours after application or until dry.

Re-cropping: Labelled crops can be planted immediately following application. All other crops not on the label can be planted 14 days after the last application.

Environmental Precautions

Lance is toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified on the label.

Runoff: DO NOT apply to areas where runoff is likely to occur. Boscalid is persistent and will carry over; it is recommended that this product not be used in areas treated with this product during the previous season.

Toxicity

Ingestion: Lance WDG low toxicity by ingestion. Acute oral LD₅₀ (male/female rat) = > 2,000 mg/kg. **Dermal:** Low

Lance WDG (cont'd)

toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store in original, tightly closed container. Do not ship or store near food, feed, seed and fertilizers. Store in a cool, dry, locked, well ventilated area without a floor drain.

Polyram DF

Group M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Polyram DF (PCP # 20087)	BASF Canada	Metiram: 80%	Water dispersible granules	20 kg bag

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Staging and comments
Potato	Early and late blight	0.45 - 0.91 kg	Apply at 7 - 10 day intervals using 0.45 - 0.71 kg/ac until plants cover the row. Then increase the rate to 0.91 kg/ac until tops are killed or use 0.45 - 0.71 kg/ac at 5 - 7 day intervals starting when plants are 15 cm high and continuing until top killing. When conditions (rain or dew) favour infections, use the shorter intervals in each case. May be applied up to the day before harvest.
Sugar beets	Cercospora leaf spot	0.91 kg	Use 0.91 kg/ac when disease is noticed. Repeat at regular intervals of 7 - 10 days depending on weather conditions. Do not apply later than 21 days before harvest.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Ground equipment: all registered crops. Aerial application: potato only.

Water Volume: Ground Application: 40 - 80 L/ac. Air: 22 L/ac.

Application Tips

Apply only when meteorological conditions at the treatment site allow for complete and even crop coverage.

How it Works

A contact and protectant fungicide.

Restrictions

Do not use treated tops for feed or food.

Environmental Precautions

Do not apply to any body of water. Avoid drifting of spray onto any body of water or other non-target areas. Specific buffer zones should be observed.

Toxicity

Ingestion: Polyram DF has a low toxicity by single ingestion. Acute oral LD₅₀ (rats) = >5,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store in a cool, dry, ventilated place. Do not allow product to become wet or overheated as this will reduce its effectiveness and may create flammable vapours.

Proline 480 SC



Caution Poison

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Proline SC (PCP # 28359)	Bayer CropScience	Prothioconazole: 480 g/L	Suspension concentrate	5.1 L jug

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and comments
Barley	Fusarium Head Blight (<i>Fusarium</i> spp.) or scab (suppression only)	128 - 170 mL	Apply when 70 - 100% of the barley main stem heads are fully emerged to 3 days after full head emergence. Application of the 170 mL/ac rate is suggested in situations where disease pressure is expected to be high. Such situations may occur when prolonged periods of warm wet weather are forecast during barley head emergence, when barley and wheat is grown in a crop rotation that has contained corn or when susceptible cultivars are grown.
	Net blotch (<i>Pyrenophora teres</i>), scald (<i>Rhynchosporium secalis</i>), spot blotch (<i>Cochliobolus sativus</i>)	84 - 126 mL	Apply as a preventive foliar spray when the earliest disease symptoms appear on the leaves and stems. Barley fields should be observed closely for early disease symptoms, particularly when susceptible varieties are planted and/or under prolonged conditions favorable for disease development. Maximum of 2 applications per season; minimal spray interval of 7 days.
Wheat	Fusarium Head Blight (<i>Fusarium</i> spp.) or scab (suppression only)	128 - 170 mL	Fusarium head blight or control of glume blotch: apply within the time period from when at least 75% of the wheat heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower. Use of higher rate (170 mL/acre) will typically provide highest levels of mycotoxin reduction.
	Glume blotch (<i>Stagonosora nodorum</i>)	128 - 170 mL	
	Speckled leaf blotch (<i>Septoria tritici</i>), tan spot (<i>Pyrenophora tritici-repentis</i>), leaf rust (<i>Puccinia recondita</i>)	128 mL	Observe crop closely, and apply Proline as a preventative foliar spray when the earliest disease symptoms appear on the leaves and stems.
Canola, rapeseed, oriental mustard	Sclerotinia stem rot (<i>Sclerotinia sclerotiorum</i>)	128 - 149 mL	Apply when the canola crop is in the 20 - 50% bloom stage. Best protection will be achieved when the fungicide is applied prior to petals beginning to fall and will allow for the maximum number of petals to be protected. The 149 mL/ac rate is recommended for fields with a history of heavy disease pressure or for dense crop stands. Good spray coverage of the plants is essential. Maximum of 1 application per season.
Flax	Sclerotinia stem rot (<i>Sclerotinia sclerotiorum</i>)	128 - 149 mL	Apply when the crop is in the 20 - 50% bloom stage. Best protection will be achieved when the fungicide is applied prior to petals beginning to fall and will allow for the maximum number of petals to be protected. The higher rate is recommended for fields with a history of heavy disease pressure or for dense crop stands. Good spray coverage of the plants is essential.
Chickpeas	Ascochyta blight (<i>Ascochyta rabiei</i>)	128 - 170 mL	Apply at the first sign of disease. Maximum three applications per year.

Fungicides - Foliar Treatment

Proline 480 SC (cont'd)

Crops	Diseases	Rate per acre	Timing and comments
Lentils	Ascochyta blight (<i>Ascochyta</i> spp.)	128 - 170 mL	Apply at the first sign of disease. Maximum two applications per year.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Ground equipment: wheat, barley, canola, rapeseed, oriental mustard, flax, chickpeas, lentils. Air: canola, rapeseed, oriental mustard, flax.

Water Volume: Ground Application: Minimum of 40 L per acre.

Air: Minimum of 20 L per acre.

How it Works

Proline 480 is a broad spectrum, systemic fungicide for the control or suppression of listed diseases on registered crops.

Application Tips

Apply with a non-ionic surfactant (AgSurf or Agral 90) at 0.125% v/v.

Spray coverage is essential for optimum efficacy. Spray equipment must be set up to provide good coverage to wheat and barley heads. Nozzles should be operated within the spray pressure recommendations suggested by the manufacturer.

Restrictions

Pre-harvest interval: Barley and wheat - 30 days, canola, flax, rapeseed or oriental mustard - 36 days, chickpeas or lentils - 7 days.

Re-entry: Do not re-enter treated fields until 24 hours post-application.

Re-cropping: Treated areas may be replanted with any crop specified on the label as soon as practical after the last application. For crops not listed on the label, do not plant back within 30 days of last application.

Environmental Precautions

Proline 480 SC is toxic to aquatic organisms. Observe specified buffer zones. Do not apply this product directly to freshwater habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff

To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Toxicity

Ingestion: Proline has a low toxicity by single ingestion. Acute oral LD₅₀ (rats) = 2000 - 5,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 2,000 mg/kg.

Storage

Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, feed, plants or water. Store in original container, preferably in a locked storage area. Do not store at temperatures below freezing.

Prosaro 250 EC

Group 3

Formulation

Product	Company	Active ingredient	Formulation	Container size
Prosaro 250 EC (PCP #29820)	Bayer Crop Science	Prothioconazole: 125 g/L + Tebuconazole: 125 g/L	Emulsifiable concentrate	6.5 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre (mL)	Timing and specific use restrictions
Wheat	Control: rusts, leaf blotch, glume blotch, tan spot, powdery mildew Suppression: Fusarium head blight	320	Apply when 75% of the wheat heads on the main stem are fully emerged to when 50% of the heads are in flower.
Barley	Control: Net blotch, scald, leaf blotch, spot blotch, rusts, powdery mildew Suppression: Fusarium head blight	320	Apply when 70 - 100% of the main stem heads are fully emerged up to 3 days after full head emergence.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply by ground or aerial application equipment.

Water Volume: Ground application : Use minimum of 40 L/acre. Air: Use minimum of 20 L/acre.

Application Tips

Spray coverage is essential. Ensure thorough coverage of all wheat or barley heads for optimal suppression of fusarium head blight. Best results are achieved from forward to backward facing nozzles.

How it Works

Prosaro 250 EC is a broad spectrum fungicide for disease control in cereals with protective and curative properties.

Restrictions

A maximum of one application may be applied per crop season.

Re-cropping: None.

Re-entry: Do not enter fields for 12 hours after application.

Grazing: Do not allow livestock to graze or feed green forage to livestock prior to 6 days after treatment with Prosaro 250 EC.

Pre-harvest Interval: Wheat, barley - 36 days.

Environmental Precautions

Toxic to birds, small wild animals, aquatic organisms and non-target plants. Do not apply this product directly to freshwater habitats. Observe buffer zones. See label for specific details on buffer zones.

Toxicity

Acute oral LD₅₀ (female rat) > 2000 mg/kg.

Prosaro 250 EC (cont'd)

Storage

Do not store at temperatures below freezing. Store away from feeds, seeds, fertilizer, plants and foodstuffs. If stored for 1 year or longer, shake well before using.

Quadris

Group 11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Quadris (PCP # 26153)	Syngenta Crop Protection	Azoxystrobin: 250 g/L	Suspension	4 x 3.78 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Staging and comments
Canola	Virulent blackleg	202 mL	Apply at the 2 - 6 leaf stage. Maximum of 2 applications per season.
	Sclerotinia stem rot	283 - 404 mL	Apply at the early bloom stage (prior to 30% bloom). Use the higher rate if there is a history of Sclerotinia infection in the area, and when environmental conditions favour disease development.
	Alternaria black spot	202 mL	Apply at the pod stage (90% petal fall).
Chickpeas	Ascochyta blight (<i>Ascochyta</i> spp.)	202 mL	Apply 1st application at the first sign of disease and no later than the onset of flowering, followed by a 2nd application 10 - 14 days after the 1st application. Maximum of 2 applications per season.
Corn	Rust (<i>Puccinia sorghi</i>)	183 mL in 80 L of water/ac.	Apply prior to disease establishment and subsequently at a 7 - 14 day interval. Apply a maximum of 2 applications per season.
Lentils	Anthrachnose (<i>Collectotrichum truncatum</i>), Ascochyta blight (<i>Ascochyta</i> spp.), Asian bean rust (<i>Phakopsora</i> spp.)	202 mL	Apply 1st application at the first sign of disease and no later than the onset of flowering, followed by a 2nd application 10 - 14 days after the 1st application. Maximum of 2 applications per season.
Peas/beans	Anthrachnose Ascochyta blight (<i>Ascochyta</i> spp.), Mycosphaerella blight (<i>Mycosphaerella pinodes</i>), powdery mildew* (<i>Erysiphe pisi</i>), Asian bean rust (<i>Phakopsora pachyrhizi</i>)		Apply 1st application at the first sign of disease and no later than the onset of flowering, followed by a 2nd application 10 - 14 days after the 1st application. Maximum of 2 applications per season.
Potatoes (foliar)	Early blight	202 - 324 mL	For early blight, use the high rate and short application interval under high disease pressures. If late blight becomes established, discontinue use of Quadris and use alternative fungicides.
	Late blight	324 mL	
Potatoes (in furrows)	Silver scurf (<i>Helminthosporium solani</i>)	4 - 6 mL product/100 m row	Apply once as an in furrow spray in 20 - 56 L/acre. Mount the spray nozzle so the spray is directed into the furrow as a 15 - 20 cm band just before the seed is covered. Maximum of 2 applications per season.

* Peas only

Registered Tank Mixes

Always read all the labels and follow the precautionary statement, directions for use (rates, diseases controlled and application intervals) and other restrictions.

Tank mixture partner	Diseases/insects controlled	Rate	Specific remarks
Bravo 500 Potatoes (foliar)	Early blight	Quadris at 202 mL/acre Plus Bravo 500 at 808 mL/acre	Do not apply more than 3 applications of this tank mix per season. Pre-harvest interval: 2 days.
Quadris Plus Ridomil Gold (potatoes - in furrows)	Rhizoctonia stem and solon canker, black scurf and the suppression of pink rot	Quadris at 4 mL/100m row Plus Ridomil Gold at 4 mL/100m row	Do not apply more than one application per season. Pre-harvest interval: 90 days. A plant-back interval of 30 days for potatoes (root crops) is required.
Quadris Plus Ridomil Gold Plus Acatra (potatoes - in furrows)	Rhizoctonia stem and stolon canker, black scurf, pink rot (suppression only), Colorado potato beetle, potato leafhopper, aphids	Quadris at 4 - 6 mL/100m row Plus Ridomil Gold at 4 mL/100 m row Plus Acatra at 3.4 - 4.4 mL/100 m row	Do not apply more than one application per season. Pre-harvest interval: 90 days. Do not follow a soil application of Actara with a foliar application of Actara.
Matador 120 EC	All diseases with Quadris applied at 202 mL/acre PLUS Insects: all insects currently registered on the Matador 120EC label.	Quadris at 202 mL/acre plus Matador at 26 - 51 mL/acre.	Do not apply more than 2 applications of this tank mix per season. Pre-harvest interval: 15 days for vegetables, 30 days for all others including soybeans. Do not apply by air.
Tilt (barley)	Barley net blotch (<i>Pyrenophora terres</i>), barley scald (<i>Rhynchosporium secalis</i>), barley leaf rust (<i>Puccinia hordei</i>)	Quadris at 90 mL/acre Plus Tilt at 202 mL/acre	Do not make more than one application per season of this tank mixture. An additional application of Tilt can be made, if required. Do not harvest wheat for forage. Do not graze or feed livestock treated forage or cut green crop for hay or silage. Pre-harvest interval 45 days.
Tilt (Wheat and barley)	Septoria leaf spot (<i>Septoria sp.</i>), tan spot (<i>Pyrenophora tritici-repentis</i>)		
Tilt (spring wheat, winter wheat and barley)	Stripe rust (<i>Puccinia striiformis</i>)	Quadris at 80 - 120 mL/acre Plus Tilt at 161 - 202 mL/acre	
Tilt (spring wheat and winter wheat)	Wheat leaf rust (<i>Puccinia trititica</i>)		

Application Information

How to Apply: Ground equipment or by air. See label for application method of registered crops.

Water volume: Ground application - minimum of 40 L/acre. In furrow treatment - use a 20 - 57 L/acre. Air: Use minimum of 18 L/acre. Ensure uniform coverage.

Application Tips

Good coverage is essential for effective disease control.

How it Works

Quadris fungicide is a broad spectrum, preventative fungicide with systemic properties.

Restrictions

Rainfall: Avoid application of this product when heavy rain is forecast.

Grazing: Do not feed pea vine to livestock.

Pre-harvest Intervals: Canola - 30 days. Legumes - 15 days. Potatoes (foliar application) - 1 day, potato (in furrow) 90 days.

Plant-back intervals: Broadleaf and root crops - 30 days. Cereals - 45 days.

Quadris (cont'd)

Environmental Precautions

This product is toxic to fish and aquatic organisms. Observe buffer zones specified on the label. Do not apply this product directly to aquatic habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff: Avoid application to areas where runoff is likely to occur. Runoff from treated areas into aquatic habitats may be hazardous to aquatic organisms.

Leaching: The use of this product may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Ingestion: Quadris is non-toxic by single ingestion. Acute oral LD₅₀ (rats) = > 5,000 mg/kg. **Dermal:** Non-toxic by dermal contact. Acute dermal LD₅₀ (rat) = > 4,000 mg/kg.

Storage

Keep in original container, tightly closed, during storage. Store in a cool, dry, well ventilated area. Do not store below 0°C.

Quilt

Group 3.11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Quilt (PCP #23328)	Syngenta Crop Protection	Azoxystrobin: 75 g/L + Propiconazole: 125 g/L	Suspension	2 x 10.125 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific use restrictions
Barley	Barley net blotch	303 mL	Apply once between stem elongation and half-head emergence. Do not make more than 1 application per season. Pre-harvest interval: 45 days.
	Barley scald	303 mL	
	Barley leaf rust	404 mL	
Wheat, barley	Septoria leaf spot	303 mL	
	Tan spot	303 mL	
	Stripe rust	303 - 404 mL	
Wheat (spring, winter)	Wheat leaf rust	303 - 404 mL	
Corn (field, sweet, seed)	Rust, northern corn leaf blight, eye spot, grey leaf spot	303 - 404 mL	Make first application at the first sign of disease; repeat at 14 days interval. Do not apply to field corn and field corn grown for seed after brown silk. Pre-harvest Interval: forage corn - 30 days, sweet corn - 14 days. Do not make more than 2 applications per season.
Lentils, soybean	Anthrachnose	404 - 606 mL	Make the first application at the first sign of disease. A second application at a 14 day interval may be needed if disease conditions persist.
Legume vegetable, soybeans	Asian rust	404 - 606 mL	Make the first application at the first sign of disease. Apply the high rate only under conditions of high disease pressures. Pre-harvest interval: legume vegetables, soybeans - 30 days; succulent podded and shelled legume vegetables - 15 days.
	Powdery mildew	404 mL	

Registered Tank Mixes

Tank mixture partner	Diseases and insects controlled
Matador 120 EC Warrior	See labels for disease and insects controlled, application instructions and precautions.

Application Information

How to Apply: Apply with: Ground sprayers or by air.

Water volume: Ground application - 40 L/acre. Air: Use minimum of 18 L/acre.

Application Tips

Quilt has some phytotoxic effects when mixed with products that are formulated as Emulsifiable Concentrate. These effects are enhanced if applications are made under cool, cloudy conditions, and these conditions remain for several days following application. In addition, adjuvants that contain some form of silicone may contribute to phytotoxicity. Do not apply during periods of dead calm. Avoid application of this product when winds are gusty.

How it Works

Quilt consists of two fungicides, which both have systemic properties and have different modes of action. It has both preventative and curative activity.

Restrictions

Rainfall: Do not apply if heavy rainfall is forecast.

Re-cropping: Do not rotate to any crop intended for food, grazing or any component of animal feed or bedding within 105 days of applying Quilt unless the second crop appears on the Quilt label.

Environmental Precautions

This product is toxic to fish and aquatic organisms. Observe buffer zones specified on the label. Do not apply this product directly to aquatic habitats. Azoxystrobin is persistent and will carryover. It is recommended that this product not be used in areas treated with Azoxystrobin during the previous season.

Runoff: Avoid application to areas where runoff is likely to occur. Runoff from treated areas into aquatic habitats may be hazardous to aquatic organisms.

Leaching: The properties of this product indicate it may leach to ground water. The use of this product may result in contamination of ground water, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

Toxicity

Ingestion: Quilt is slightly toxic by single ingestion. Acute oral LD₅₀ (rats) = > 1,750 mg/kg. **Dermal:** Non-toxic by dermal contact. Acute dermal LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Keep in original container.

Ranman 400SC

Group 21

Formulation

Product	Company	Active ingredient	Formulation	Container size
Ranman (PCP # 27984)	U.A.P.	Cyazofamid: 400 g/L	Suspension	4 x 3.79 L

Ranman 400SC (cont'd)**Crops, Diseases Controlled, Rates and Timing**

Crops	Diseases	Rate per acre	Timing and specific use restrictions
Potatoes	Late blight	40 - 80 mL	Use the low rate (40 mL product/acre) for preventative applications or very low disease pressure, increasing the rate as disease pressure and/or crop development increases, up to a maximum rate (80 mL product/acre). For late blight tuber rot control, ensure that the last 2 - 3 applications of Ranman 400SC prior to desiccation are made at the maximum rate (80 mL product/acre) following resistance management practices. After one application, alternate Ranman 400SC fungicide with at least one application of fungicide having a different mode of action for control of late blight. Do not make more than 6 applications per year.

Note: Must be tank-mixed with non-ionic or organosilicone surfactant at 0.6 L/acre

Registered Tank Mixes

None registered.

Application Information

How to Apply: Ground equipment only.

Water Volume: Apply in sufficient water volume to obtain coverage of the foliage. Spray volume will vary with the amount of plant growth and ranges from 80 to 242 litres per acre.

How it Works

The active ingredient cyanofamid is a member of the cyanofamidazole class of chemistry and has preventative and protectant activity. Although Ranman 400SC has limited systemic activity, it should be treated as a protectant fungicide and applied before the disease enters the crop.

Restrictions

Effects of Rainfall: Do not apply if heavy rainfall is imminent.

Pre-harvest Interval: 7 days.

Re-entry: Do not enter treated areas within 12 hours.

Re-cropping: A plant-back interval of 30 days is required.

Environmental Precautions

This product is toxic to aquatic organisms. Observe buffer zones specified on the label. To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment.

Toxicity

Ingestion: Ranman 400 SC is non-toxic by single ingestion. Acute oral LD_{50} (rats) = > 5,000 mg/kg. **Dermal:** Slightly toxic by dermal contact. Acute dermal LD_{50} (rat) = > 2,000 mg/kg.

Storage

Store product in original container in a secured, dry place separate from other pesticides, fertilizer, food and feed.

Reason 500 SC

Group 11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Reason 500 SC (PCP # 27462)	Bayer CropScience	Fenamidone: 500 g/L	Suspension concentrate	2, 4, or 10 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate	Timing and specific comments
Potatoes	Early blight	80 mL as a tank mix with either Diathane D.G at 500 grams/acre or Bravo 500 at 500 mL/acre	Begin application when plants are 15 - 20 cm high or when disease threatens. Apply a fungicide having a different mode of action within 7 - 10 days after each application. Use the shorter spray interval when conditions favour disease development.
	Late blight		

Registered Tank Mixes

See information in table above.

Application Information

How to Apply: May be applied with ground equipment or by air.

Water Volume: Ground applications - minimum of 91 L of water/acre. Air - minimum of 15 L/acre.

Application Tips

Reason 500 SC should be applied as a preventative disease control measure. Good coverage is essential for effective disease control.

How it Works

Reason 500 SC is a preventative, protectant fungicide that inhibits spore germination and acts as an anti-sporulant.

Restrictions

Pre-harvest Interval: 14 days.

Re-cropping: Potatoes and all other crops may be rotated following a minimum plant-back interval of 30 days.

Environmental Precautions

Reason 500 SC is toxic to aquatic organisms. Observe buffer zones specified on the label. This product may be harmful to beneficial predatory or parasitic arthropods.

Runoff: To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast.

Toxicity

Ingestion: Reason 500 SC is non-toxic by single ingestion. Acute oral LD_{50} (rats) = > 5,000 mg/kg. **Dermal:** Non-toxic by dermal contact. Acute dermal LD_{50} (rat) = > 5,000 mg/kg.

Storage

Store container in a cool, dry place away from feeds, seeds, fertilizers, plants and foodstuffs. If stored for 1 year or longer, shake well before using. Do not store at temperatures below freezing.

Revus

Group 40

Formulation

Product	Company	Active ingredient	Formulation	Container size
Revus (PCP # 29074)	Syngenta Crop Protection	Mandipropamid:250 g/L	Suspension	4 x 3.785 L

Revus (cont'd)**Crops, Diseases Controlled, Rates and Timing**

Crops	Diseases	Rate	Timing and specific comments
Potatoes	Late blight	0.16 - 0.24 L/acre	Begin applications prior to disease development and continue throughout the season on a 7-10 day schedule of fungicides, following resistance management guidelines (see label for details). Do not make more than 4 applications in a season.

Note: The use of non-ionic adjuvant at 0.25 % v/v is recommended.

Registered Tank mixes

Revus at 0.16 - 0.24 L/acre can be tank mixed with Bravo 500 at 0.19 - 0.4 L/acre.

Application Information

How to Apply: May be applied with ground equipment or by air.

Water Volume: Ground: minimum of 40 L/acre. In situations where a dense canopy exists and/or pest pressure is high, use higher water volumes. Aerial: minimum of 18 L/acre.

Surfactant: Non-ionic adjuvant is recommended at 0.125%.

How it Works

After application, Revus adheres to the waxy cuticle of treated leaves, becomes rainfast and establishes a barrier to prevent fungi from taking hold. The fungicide also enters the leaf to provide protection to both sides of the leaf. Revus also provides anti-germination effects; therefore, disease spores that land on the plant are prevented from germinating.

Restrictions

Pre-harvest Interval: 14 days.

Re-cropping: Do not plant any crop, which is not registered for use with Revus for a period of 30 days after the last application.

Re-entry: Do not enter or allow worker entry into treated areas during the restricted-entry interval of 12 hours.

Environmental Precautions

Do not apply this product directly to freshwater habitats. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Runoff: To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast.

Toxicity

Ingestion: Revus is non-toxic by single ingestion. Acute oral LD_{50} (rat) = > 5,000 mg/kg. **Dermal:** Non-toxic by dermal contact. Acute dermal LD_{50} (rat) = > 5,000 mg/kg.

Storage

Store container in a cool, dry place.



Warning Poison

Ridomil Gold/Bravo Twin-Pak

Group M, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Ridomil Gold Bravo Twin-Pak (PCP # 26443)	Syngenta Crop protection	Chlorothalonil: 720g/L + Metalaxyl: 480 g/L	Liquid	6.4 L jug

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Potatoes	Early blight, botrytis vine rot, late blight, late blight tuber rot and the suppression of Pythium leak and pink rot in potatoes	One 6.4 L jug will treat 10 acres	Apply early in the season when conditions are favorable for disease (before disease infection), but no later than when plant foliage meets within the row uniformly across the field. Apply a second and third application of Ridomil Gold/Bravo at 14-day intervals. The label rate of a registered contact fungicide should be applied 7 days after each Ridomil Gold/Bravo application. Following the last application of Ridomil Gold/Bravo, apply the labelled registered contact fungicide at its recommended timing throughout the remainder of the season. Do not make more than 3 applications per season, regardless of disease being treated.

Note: If applications of Ridomil Gold/Bravo fungicide are made for control of foliar diseases, additional applications of tuber disease control are not needed.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with ground sprayers or by aircraft.

Water Volume: Apply in sufficient water to ensure thorough coverage of foliage. Ground - 91 - 647 L/acre Note: water volume varies, depending on amount of foliage. Aerial - 20 L/acre.

Caution: Do not let tank contents stand for prolonged periods without agitation.

Application Tips

Do not tank mix with a top killer (crop desiccant).

How it Works

Ridomil Gold Bravo 720 Twin-Pak contains 2 active ingredients, chlorothalonil and metalaxyl. The metalaxyl component is an acylalanine fungicide with systemic activity. The chlorothalonil component provides contact activity.

Restrictions

Pre-harvest Interval: Do not apply within 14 days of harvest.

Environmental Precautions

Ridomil Gold Bravo 720 Twin-Pak is toxic to fish. Do not contaminate lakes, streams or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply where runoff is likely to occur. Do not apply when weather conditions favour drift from treated areas. In order to minimize risk to the environment from the use of this product, do not use on coarse textured gravelly soils, soils with less than 2% organic matter or in areas where the water table may be high.

Toxicity

Ridomil Gold Bravo 720 Twin-Pak contains 2 fungicides. Bravo 720 and Ridomil Gold 480.

Ingestion: Bravo 720 has a low toxicity by single ingestion. Acute oral LD₅₀ (rat) = > 4,200 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 20,000 mg/kg.

Ingestion: Ridomil Gold 480 has low toxicity by single ingestion. Acute oral LD₅₀ (rat) = > 1,172 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rabbit) = > 2,020 mg/kg.

Storage

Store in a cool, dry place away from feed or foodstuffs.

Ridomil Gold MZ 68WP

Group M, 4

Formulation

Product	Company	Active ingredient	Formulation	Container size
Ridomil Gold MZ 68WP (PCP # 25379)	Syngenta Crop Protection	Metalaxyl-M + Mancozeb	Wettable powder	5 Kg

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Potatoes	Early blight, late blight, tuber rot	1 kg	Apply up to 3 applications per season. First application should be made prior to plant leaf contact in the potato row. Apply second and third applications at 10-14 day intervals. Five to seven days after each Ridomil Gold application, apply a contact fungicide that is registered for late blight. Following the final Ridomil Gold application, apply a contact fungicide recommended for late blight control at the recommended rate and interval to the end of the season.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Apply with ground sprayers or by aircraft.

Water Volume: Ground: Apply in sufficient water to ensure thorough coverage of foliage. Aerial – minimum of 20 L/acre.

Application Tips

When conditions are very favourable for late blight development, the shortest interval between fungicide applications is recommended. Discontinue the use of this product when potato vines start to look mature.

How it Works

Ridomil Gold MZ is a combination of a systemic and contact fungicide. It has both preventative and curative activity.

Restrictions

Pre-harvest Interval: Do not apply within 14 days of harvest.

Environmental Precautions

Do not apply this product directly to freshwater habitats. Do not contaminate irrigation or aquatic habitats by cleaning of equipment or disposal of wastes.

Run-off: Do not apply to terrains where there is a potential for surface runoff to enter aquatic systems. Avoid application of this product when heavy rain is forecast.

Leaching: The use of Ridomil Gold MZ in areas where soils are permeable, particularly where the water table is shallow may result in groundwater contamination.

Toxicity

Ingestion: This product has a low acute mammalian toxicity. Acute oral LD₅₀ (rat) mancozeb = 5,000 mg/kg, metalaxyl = 669 mg/kg.

Storage

Dry, heated storage above 0°C.

Rovral Flo/Rovral RX



Warning Poison

Group 2

Formulation

Product	Company	Active ingredient	Formulation	Container size
Rovral Flo (PCP # 29315)	Bayer CropScience Inc	Iprodione: 240 g/L	Flowable	2 x 8.4 L pack
Rovral RX (PCP # 24378)	Monsanto Canada Inc	Iprodione: 240 g/L	Suspension	2 x 8.4 L pack

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Alfalfa (seed production)	Sclerotinia	0.85 - 1.25 L	Apply when the crop is in the 20 - 50% bloom stage. The high rate is recommended for fields with a history of severe disease pressure and dense crops stands.
Canola	Sclerotinia stem rot	Single application: 0.85 - 1.25 L	Apply at 20 - 50% bloom. For best results, apply at 20 - 30% bloom (prior to petals beginning to fall). The use of the higher rate on the first application is recommended for fields with a history of severe disease pressure and dense crop stands. Do not make more than 2 applications per season.
		Split application: 0.42 - 0.63 L/acre at 20% bloom followed by 0.42 L/acre at 50% bloom.	
		Single application for Low Disease Pressure: 0.63 L/acre	
	Alternaria black spot	Single application: 0.85 L	Apply at early green pod stage*. Do not make more than 2 applications per season.
		Split application: 0.42 L/acre at 20 - 50 % bloom followed by 0.42 L/acre at the early green pod stage	

*Early green pod stage: Almost all canola pods are fully formed and still green with only a few flowers or undeveloped pods remaining at the top of the plant.

Registered Tank Mixes

None registered.

Application Information

How to Apply: May be applied with ground sprayers and by air.

Water Volume: Ground - 40 L/acre. Air (canola only) - minimum of 18 L/acre.

How it Works

The active ingredient iprodione protects canola and alfalfa against sclerotinia stem rot and alternaria black spot.

Restrictions

Rainfall: Do not spray in heavy dew or when rain is imminent.

Grazing: Treated alfalfa vegetation is not be used for animal feed.

Preharvest Interval: 38 days.

Environmental Precautions

Do not apply directly to water. Overspray or drift to sensitive habitats should be avoided. Do not contaminate sensitive areas through direct application, drift or disposal of waste or cleaning equipment.

Rovral Flo/Rovral RX (cont'd)

Toxicity

Ingestion: Iprodione has a low toxicity by single ingestion. Acute oral LD₅₀ (male rat) = > 5,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rabbit) = > 2,000 mg/kg.

Storage

Store above 0°C.

Scala SC



Caution Poison

Group 9

Formulation

Product	Company	Active ingredient	Formulation	Container size
Scala (PCP # 280110)	Bayer CropScience Inc	Pyrimethanil: 400 g/L	Suspension	2 L, 10 L jug

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Potatoes	Early blight	Scala SC must be applied in tank mix with Bravo 500: Scala SC at 300 mL PLUS Bravo 500 at label rate	Apply when plants are 15 - 20 cm high or when environmental conditions are conducive to disease development. Repeat applications at 7 - 14 day intervals or as necessary to maintain disease control. If severe disease conditions exist, use the 7-day interval. A maximum of six applications per year.

Application Information

How to Apply: May be applied with ground equipment or by air (potatoes only).

Water Volume: Potatoes - Ground 120 L/acre. Aerial: 14 L/acre.

Caution: Do not apply more than 2.4 L/acre in a single growing season.

Application Tips

Thorough coverage of all plant parts to be protected is essential for good disease control. Use sufficient water volume and spray pressure to provide thorough and uniform coverage for optimum disease control.

How it Works

Scala SC is a systemic fungicide that is effective on the above noted disease. Scala SC is best suited for use in a preventative treatment program.

Restrictions

Rainfall: Do not apply if heavy rain is forecast.

Pre-harvest Interval: Potatoes 7 days.

Re-cropping: Wheat may be planted 30 days following the application of Scala SC. For all other crops not listed on the Scala SC label, a plant-back interval of 130 days must be observed.

Environmental Precautions

This product is toxic to aquatic organisms. For ground application, maintain a 1 metre buffer zone between areas sprayed and aquatic systems. For aerial application in potatoes, maintain a 10 m buffer zone between areas sprayed and aquatic systems.

Runoff: Do not apply where runoff likely to occur. Do not apply this product through any type of irrigation system.

Toxicity

Ingestion: Scala SC has a low toxicity by single ingestion. Acute oral LD₅₀ (male rat) = > 5,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 4,000 mg/kg.

Storage

Store above 0°C. Do not store near feed or foodstuffs.

Senator 70 WP

Group 1

Formulation

Product	Company	Active ingredient	Formulation	Container size
Senator 70 WP (PCP # 25343)	Nippon Soda Co. Ltd	Thiophanate-methyl: 70 %	Wettable powder	2 kg

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Beans, white	White mold	700 - 900 grams	Apply when conditions favouring development of disease exist. This usually occurs during the early stages of bloom prior to the rows closing in. If disease conditions persist, repeat applications may be warranted.
Sugar beets	Leaf spot	170 - 227 grams	Apply when disease first appears. Repeat 14 - 21 days later if required. Make a maximum of two applications per growing season. Pre-harvest interval: 21 days. For sugar beets grown for export only.

Registered Tank Mixes

None registered.

Application Information

How to Apply: May be applied with ground equipment (sugar beets and white beans) or by air (white beans only).

Water Volume: ground equipment - 404 L/acre. air - 20 - 24 L/ac.

How it Works

Senator 70 WP is a systemic fungicide for control of certain fungus diseases such as white mold and leaf spot.

Restrictions

Grazing: Do not feed or allow livestock to graze on treated crops. No sugar beets or parts of sugar beets are to be used as fodder or feed.

Environmental Precautions

Do not apply to any body of water. Avoid drifting of spray onto any body of water or other non-target areas. Observe the buffer zones specified on the label. Do not apply during periods of dead calm or when wind velocity and direction pose a risk of spray drift.

Toxicity

Ingestion: Low toxicity by single ingestion. Acute oral LD₅₀ (rats) technical = >6,000 mg/kg.

Storage

Store in a dry place.

Serenade ASO

Bio fungicide

Formulation

Product	Company	Active ingredient	Formulation	Container size
Serenade ASO (PCP# 28626)	Agra Quest Inc./U.A.P.	<i>Bacillus subtilis</i> 1 x 10 ⁸ CFU/g	Suspension	9.46 L, 500 L, 1000 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Beans, chickpea, lentil, pea (all types)	Botrytis blight Sclerotinia stem rot	1.6 - 6.0 L	Begin application soon after emergence and when conditions are conducive for disease development. Repeat on 7 - 10 day intervals.
Canola	Sclerotinia stem rot	0.4 - 1.6 L	Begin application at 20% to 30% bloom. A second application may be made 7 - 10 days later, at approximately 50% bloom and prior to significant petal fall, if conditions for disease development remain favourable. Use higher rates in fields with a history of heavy disease pressure.
Potatoes	Early blight	3.2 - 6.0 L	Begin application soon after emergence and when conditions are conducive for disease development. Repeat on 7 - 10 day intervals.
Potatoes (post-harvest)	Silver scuff	85-175 mL per tonne of potatoes	Conveyor Line Application: Prepare the equivalent of 5 - 10 litres of Serenade in 100 litres of water. Spray 2 litres of the Serenade/water suspension per tonne of potatoes. Potatoes must rotate along the conveyor line into the storage area to ensure complete coverage.

Application Information

How to Apply: May be applied by ground sprayers or by air.

Water Volume: Use appropriate application volume to give good canopy penetration and coverage of plant parts to be protected.

How it Works

Serenade ASO is a broad spectrum, preventative biofungicide for the suppression of plant diseases. It may be applied as a foliar spray alone or in an alternating spray program with other registered crop protection products.

Restrictions

Pre-harvest Intervals: Serenade ASO can be applied up to and including the day of harvest.

Environmental Precautions

Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wash water.

Toxicity

Ingestion: Serenade ASO has a low toxicity by single ingestion. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 5,000 mg/kg.

Storage

Store at room temperature for up to two years from the date of manufacture.

Stratego 250 EC



Danger Irritant

Group 3, 11

Formulation

Product	Company	Active ingredient	Formulation	Container size
Stratego 250 EC	Bayer CropSciences Inc	Propiconazole: 125 g/L + Trifloxystrobin: 125 g/L	Emulsifiable concentrate	8 L jug

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Wheat (spring, durum, winter)	Leaf and stem rust, powdery mildew, <i>Septoria</i> leaf blotch, stripe rust, tan spot	202 mL	Apply at the very early stages of disease development. This could occur any time during tillering or stem elongation. Typically, one application from tillering up to flag leaf emergence is required. A second application may be made if needed.
Barley	Net Blotch; scald, <i>Septoria</i> leaf blotch, spot blotch	202 mL	Timing of Application: Single application: 4-leaf stage up to early heading. Two applications: First application: 4-leaf stage to flag leaf stage. Second application: before early heading, but not within 14 days of the first application.
Oats	Crown rust, <i>Septoria</i> leaf blotch	202 mL	Do not apply after early heading (head is half emerged).

Registered Tank Mixes

Wheat: Buctril M, Buctril M + Puma¹²⁰ Super, Buctril M + Puma Advance Herbicide, Puma¹²⁰ Super + Refine Extra, Puma Advance + Refine SG, Infinity, Puma Advance + Infinity, Velocity M3.

Barley: Puma¹²⁰ Super + Refine Extra, Puma Advance + Refine SG.

Application Information

How to Apply: May be applied with ground equipment or by air.

Water volume: Ground: 40 - 80 L/ac. Air Minimum of 20 L/ac.

How it Works

Stratego 250 EC is a broad spectrum, foliar fungicide for disease control in cereals. Stratego contains two active ingredients providing both preventative and systemic activity resulting in sustained residual protection.

Restrictions

Rainfall: If rainfall occurs within one hour of application, re-application may be necessary.

Grazing: If one application per season is applied do not allow livestock to graze within the treated area within 30 days. If two applications per season are applied, do not allow livestock to graze within the treated area and do not harvest the treated crop for forage or hay.

Pre-harvest Interval: Do not apply within 45 days of harvest.

Re-cropping: Treated areas may be replanted immediately following harvest with any crop listed on the label. For crops not listed on the label, do not plant back within 30 days of last application.

Environmental Precautions

Stratego 250 EC is toxic to fish and other aquatic organisms. Do not contaminate water by cleaning of equipment or disposal of wastes. Observe the buffer zones specified on the Stratego 250 EC label.

Runoff: Do not apply to areas where runoff is likely to occur. Runoff from treated areas into aquatic habitats may be hazardous to aquatic organisms.

Stratego 250 EC (cont'd)

Leaching: Residues of this product demonstrate the properties and characteristics associated with chemicals detected in groundwater. The use of this product in areas where soils are permeable, particularly where the depth to the water table is shallow, may result in groundwater contamination.

Toxicity

Ingestion: Stratego 250 EC has a low toxicity by single ingestion. Acute oral LD₅₀ (male rat) = > 4,757 mg/kg.

Dermal: Low toxicity by dermal contact. Acute dermal LD₅₀ (rat) = > 5,050 mg/kg.

Storage

Store container in a cool, dry place away from food, drink and animal feedstuffs. Keep leftover product in original container. Protect from freezing.



Warning Poison

Tanos 50 DF

Group 11, U

Formulation

Product	Company	Active ingredient	Formulation	Container size
Tanos 50 DF (PCP# 27435)	E.I. duPont Canada	Famoxadone: 25% + Cymoxanil 25%	Dry flowable	2.5 kg, 5.0 kg

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Potatoes	Early blight, late blight	227 - 340 g	Apply to foliage on 7-day interval. Make no more than 6 applications per year. Under low to moderate disease infestations, use the lower rates of this product. Under moderate to high infestations, use the higher rate. Pre-harvest Interval 14 days.

Registered Tank Mixes

None registered.

Application Information

How to Apply: May be applied with ground sprayers or air assisted sprayers. Do not apply by air.

Water volume: Use 100 - 120 L/ac water volume with conventional sprayers. Use a minimum of 44 L/ac water volume with air assisted sprayers.

Application Tips

Tanos 50 DF must not be applied to any crop suffering from stress as a result of drought, waterlogging, low temperatures, insect attacks, nutrient or lime deficiency or other factors reducing crop growth.

How it Works

Tanos 50 DF is both a protectant and locally systemic fungicide containing two different modes of action.

Restrictions

Rainfall: Tanos 50 DF fungicide rapidly penetrates into plant tissues and is rainfast within 12 hours after application.

Re-cropping: Crops that are on the Tanos 50 DF label may be planted back at any time; cereal grains may be planted back following a minimum plant-back interval of 30 days, and all other crops may be planted back following a minimum plant-back interval of one year.

Re-entry: Do not re-enter treated areas within 24 hrs of application.

Environmental Precautions

Tanos 50 DF is toxic to fish and other aquatic organisms. This product is toxic to birds and wild mammals and

is harmful to beneficial arthropods, such as predators and parasitoids. Observe buffer zones specified on the product label.

Runoff: Do not apply to areas that are vulnerable to runoff. If rainfall is imminent, delay spraying.

Toxicity

Ingestion: Tanos 50 DF contains 2 active ingredients: Famoxadone and Cymoxanil. **Famoxadone** has a low toxicity by single ingestion. Acute oral LD₅₀ (rat) = > 5,000 mg/kg. Dermal: Moderately toxic by dermal contact. Acute dermal LD₅₀ (rabbit) = > 2,000 mg/kg. **Cymoxanil** is slightly toxic by single ingestion. Acute oral LD₅₀ (rat) = > 960 mg/kg. Non-toxic by dermal contact. Acute dermal LD₅₀ (rabbit) = > 2,000 mg/kg.

Storage

Store product closed in original container only. Protect against humid air and water. Keep container tightly closed.



Danger Corrosive

Tattoo C

Group U, M

Formulation

Product	Company	Active ingredient	Formulation	Container size
Tattoo C (PCP #24544)	Bayer CropScience	Propamocarbhydrochloride: 375g/L + chlorothalonil : 375 g/L	Suspension	10 L

Crops, Diseases Controlled, Rates and Timing

Crops	Diseases	Rate per acre	Timing and specific comments
Potatoes	Late blight	1.09 L	Begin applications when conditions are favourable for disease, but before infection, and continue on 7-14 day intervals until the threat of disease is over. Use the 7-day interval when the risk and conditions for disease are high. Do not apply more than 3 applications per season. Pre-harvest Interval: 7 days.

Registered Tank Mixes

None registered.

Application Information

How to Apply: Ground equipment only. Do not apply by air.

Water volume: Apply in 80 - 120 L of water per acre. Ensure thorough coverage of the potato foliage.

Caution: Do not allow spray mixture to remain in tank overnight or for long periods during the day without agitation.

Application Tips

Thorough spray coverage of all plant material (particularly lower stems) is essential to attain optimum systemic activity. If multiple fungicide applications are required, rotation with other fungicide products is recommended. Where possible, Tattoo C should be applied in alternation with a fungicide having a different mode of action. Treatments with any product containing chlorothalonil must be separated by a minimum of 7 days.

How it Works

Tattoo C is a fungicide that combines the systemic action of propamocarb hydrochloride with the contact activity of chlorothalonil to give protection against late blight of potatoes. Propamocarb hydrochloride only moves upward in the potato plant, so it is essential to ensure coverage of the lower portions of the plant.

Tattoo C (cont'd)**Restrictions**

Grazing: Do not feed treated crops to livestock.

Re-cropping: Do not plant a new crop in the treated area within 120 days of the last application.

Re-entry: Do not re-enter treated areas within 48 hours after treatment.

Environmental Precautions

This product is toxic to fish, aquatic invertebrates and marine/estuarine organisms. Do not apply directly to water and to areas where surface water is present. Do not apply this product through any type of irrigation system. Do not contaminate water when disposing of equipment washwaters. A buffer zone of 15 metres should be observed around bodies of water in order to protect aquatic organisms from drift.

Runoff: Do not apply where runoff is likely to occur. Runoff from treated areas may be hazardous to aquatic organisms.

Toxicity

Ingestion: Tattoo C has a low toxicity by single ingestion. Acute oral LD₅₀ (rat) = > 2,000 mg/kg. **Dermal:** Low toxicity by dermal contact. Acute dermal LD₅₀ (rabbit) = > 4,000 mg/kg.

Storage

Cannot be stored below freezing. Keep away from fire or open flame or other sources of heat. If stored for 1 year or longer, shake well before using.

Tilt 250 E/ Bumper 418 EC/Pivot 418 EC



Caution Poison



Warning Poison

Group 3**Formulation**

Product	Company	Active ingredient	Formulation	Container size
Tilt 250 E (PCP #19346)	Syngenta Crop Protection	Propiconazole: 250 g/L	Emulsifiable concentrate	5 L, 4 x 5 L
Bumper 418 E (PCP #28017)	MANA Canada	Propiconazole: 418 g/L		2 x 4.8 L
Pivot 418 EC (PCP # 28219)	Interprovincial Co-operatives	Propiconazole: 418 g/L		2 x 4.8 L

Crops, Diseases Controlled, Rates and Timing

Crop	Diseases	Rate per acre		Timing
		Tilt	Bumper/Pivot	
Wheat (durum, spring, winter)	Septoria leaf spot, Septoria glume blotch, powdery mildew, leaf rust, stem rust, tan spot, stripe rust	202 mL	121 mL	Early Application: At the first sign of disease, usually at the beginning of stem elongation. Late Application: Before head is half emerged.
Barley	Net blotch, spot blotch, scald, powdery mildew Septoria leaf spot, leaf rust, stem rust			
Oats	Septoria leaf blotch, crown rust			
Canary seed	Septoria leaf mottle	202 mL	121 mL	Apply only once at flag leaf emergence.
Timothy	Purple eyespot	202 mL	Pivot: 121 mL Bumper: Not registered	Early Application: Apply at the first sign of disease. Late application: Full flowering.

Crop	Diseases	Rate per acre		Timing
		Tilt	Bumper/Pivot	
Beans (dry)	Rust	202 mL	121 mL	Apply when there is 5% disease level in the field, followed by a second application 14 days after the first if disease development persists.
Chickpeas, lentils, peas	Asian rust	202 - 305 mL	Not registered	
	Powdery mildew	202 mL	Not registered	
Canola	Blackleg	202 mL	121 mL	Apply during the rosette stage (2 nd leaf - bolting).
Corn	Rust	202 mL	101 mL	Apply at the first sign of the disease.
	Northern corn leaf blight	101 - 202 mL	61 - 121 mL	
	Eye spot	202 mL	121 mL	

Registered Tank Mixes

Herbicides:

Tilt: 2,4D Amine, MCPA Amine, Buctril M, Pardner, Horizon 240EC, Axial 100EC, Broadband. **Bumper:** 2,4D Amine, MCPA Amine, Badge, Bromatril, Horizon 240EC. **Pivot:** 2,4D Amine, MCPA Amine, Buctril M, Pardner, Horizon 240EC, Logic M, Badge.

Insecticides: In corn only, Tilt and Pivot may be tank mixed with one of the following herbicides: Matador, Ripcord. Bumper may be tank mixed only with Silencer.

In legumes, Tilt 250E can be tank mixed with Matador.

Fungicides: In wheat and barley, Tilt 250E can be tank mixed with Quadris.

In legumes, Tilt 250E can be tank mixed Quadris for Asian soybean rust.

Application Information

How to Apply: May be applied with ground equipment or by air.

Water Volume: Ground: 80 L/acre. Air: 16 - 20 L/acre.

Application Tips

Good coverage is essential for effective disease control. Any reduction in water volume can reduce disease control.

How it Works

Partially systemic. Propiconazole is transported upwards in plants. It has both preventative and curative activity. Length of control will vary from 3 - 4 weeks depending on disease, crop and environmental conditions. Strongly absorbed by most soils.

Restrictions

Rainfall: If rainfall occurs within one hour of application, re-application is necessary.

Grazing: Do not graze animals on treated green crops within three days of application. Do not feed straw from crops treated with herbicide tank mixes to livestock.

Pre-harvest Intervals: Wheat, barley and oats: 45 days. Canola: 60 days. Beans: 28 days. Timothy: 14 days. Corn: 30 days (field corn harvested for forage), 14 days (sweet corn). See label for pre-harvest intervals when tank mixing with a herbicide or an insecticide.

Environmental Precautions

Propiconazole is toxic to fish. Do not spray any body of water by direct application, drift or by cleaning/rinsing spray equipment. Formulated products contain petroleum distillate that is moderately to highly toxic to aquatic organisms.

Toxicity

Ingestion: Tilt is slightly toxic by single ingestion. Acute oral LD₅₀ (rat) = > 2,105 mg/kg. **Dermal:** Slightly toxic by dermal contact. Acute dermal LD₅₀ (rabbit) = > 4,250 mg/kg. **Bumper 418 EC:** Slightly toxic by single ingestion. Acute oral LD₅₀ (rat) = > 2,000 mg/kg. **Pivot 418 EC:** No toxicity information is listed.

Storage

Heated storage only.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide**Herbicide Selector Chart - Cereals**

Crop	American Nightshade	Annual Smartweed/Lady's Thumb			Annual Sow-thistle	
Barley	Achieve Liquid Gold Approve Badge Benchmark Bromotril Brotex 240 Buctril M Koril Leader Logic M Mextrol Pardner Thrasher Thumper Titanium	Achieve Liquid Gold Accurate Ally Approve Assert FL Attain XC Badge Banvel II Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400' Cobutox 600' Crossfire Curtail M	Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB Embutox 625' Estoprop Plus\ Estoprop XT Frontline Hawkeye Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA	MCPA ¹ (all forms) Mextrol Nimble Pardner Prestige XC Refine SG Sencor Spectrum Sword Target Thumper Titanium Tracker XP Thrasher Trophy Turboprop Unity	Accurate ¹ Ally ¹ Assert FL ¹ Attain XC ¹ Benchmark ¹ Broadband ¹ Clovitox Plus ¹ Crossfire ¹ Curtail M Dichlorprop D/DX DyVel DSp 2,4-D ¹ Estoprop Plus Estoprop XT Frontline	Infinity MCPA ¹ (all forms) Prestige XC Refine M ¹ Retain ¹ Spectrum Sword Target Topside Tracker XP Triton C Tropotox Plus Tundra Turboprop
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Approve Badge Benchmark Bromotril Brotex 240 Buctril M Koril Leader Logic M Mextrol Pardner Signal D Signal M Thrasher Thumper Titanium	Achieve Liquid Gold Adrenalin SC (C) Accurate Ally Approve Assert FL Attain XC Badge Banvel II Basagran + 2,4-D Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400' Cobutox 600' Crossfire ² Curtail M	Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB ¹ Embutox 625 Estoprop Plus Estoprop XT Everest Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Harmony Total Koril Leader Linuron 480 + MCPA Logic M	Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Pardner Prestige XC Refine SG Sencor Signal D Signal M Simplicity Spectrum Sword Tarnet Thrasher Thumper Titanium Tracker XP Trophy ² Turboprop Unity	Adrenalin SC (C) Accurate ¹ Ally ¹ Assert FL ¹ Attain XC ¹ Benchmark ¹ Broadband ¹ Clovitox Plus ¹ Crossfire ^{1,2} Curtail M Cypress Dichlorprop D/DX DyVel DSp 2,4-D Estoprop Plus Estoprop XT Frontline ¹	Frontline 2,4-D Harmony Max ¹ Infinity MCPA ¹ (all forms) Prestige XC Refine M ¹ Retain ¹ Spectrum Sword Target Topside Tracker XP Triton C Tropotox Plus Tundra Turboprop Velocity m3
Oats	Badge Bromotril Brotex 240 Buctril M Koril Logic M Mextrol Pardner	Badge Banvel II Bromotril Brotex 240 Buctril M Caliber 400' Cobutox 600' Curtail M Deploy	DyVel 2,4-DB ¹ Embutox 625 Frontline Hawkeye Koril Linuron 480 + MCPA Logic M Lorox + MCPA	MCPA ¹ (all forms) Mextrol Nimble Pardner Refine SG Spectrum Sword Target Tracker XP	Clovitox Plus ¹ Curtail M Frontline ¹ MCPA ¹ (all forms) Refine M ¹ Spectrum	Sword Target Topside Tracker XP Tropotox Plus
Fall Rye (spring application)	Achieve Liquid Gold Badge Bromotril Brotex 240 Buctril M Koril Logic M Mextrol Pardner	Achieve Liquid Gold Badge Bromotril	Brotex 240 Buctril M 2,4-D MCPA ¹ (all forms)	Koril Logic M Mextrol Pardner	Clovitox Plus ¹ 2,4-D ¹ MCPA ¹ (all forms)	Topside Tropotox Plus
Triticale	Bromotril Brotex 240 Koril Pardner	Bromotril Brotex 240	Koril	Pardner	Infinity	

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart - Cereals

Crop	Barnyard Grass	Bluebur	Canada Thistle
Barley	Achieve Liquid Gold Advance 10G Axial Bison Bonanza Broadband Cordon Hoe-Grass II Liquid Achieve SC Marengo Puma ¹²⁰ Super Puma Advance Rival 10G Titanium Treflan QR5 Tundra WildCat	Achieve Liquid Gold Accurate Ally Approve Attain XC Badge Benchmark Bromotril Brotex 240 Buctril M Dichlorprop D/DX 2,4-D	Estoprop Plus Estoprop XT Koril Leader Logic M MCPA (all forms) Mextrol Pardner Thrasher Thumper Titanium Turboprop
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Adrenalin SC (C) Altitude FX (C) Aurora Axial Bengal Bison Broadband Cordon Foothills Harmony Max Hoe-Grass II Horizon NG Ladder Liquid Achieve SC Marengo Nextstep Puma ¹²⁰ Super Puma Advance Signal Signal D Signal M Titanium Traxos Tundra Velocity m3 Vigil WildCat	Achieve Liquid Gold Adrenalin SC (C) Accurate Ally Approve Attain XC Badge Benchmark Bromotril Brotex 240 Buctril M Dichlorprop D/DX 2,4-D Estoprop Plus	Estoprop XT Everest GBX Frontline 2,4-D Koril Leader Logic M MCPA (all forms) Mextrol Pardner Signal D Signal M Thrasher Thumper Titanium Turboprop
Oats		Badge Bromotril Brotex 240 Buctril M Koril	Logic M MCPA (all forms) Mextrol Pardner
Fall Rye (spring application)	Achieve Liquid Gold Liquid Achieve SC Bison Marengo	Achieve Liquid Gold Badge Bromotril Brotex 240 Buctril M	2,4-D Koril Logic M MCPA (all forms) Pardner
Triticale		Bromotril Brotex 240	Koril Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart - Cereals

Crop	Cleavers		Common Chickweed ⁴		Common Groundsel	
Barley	Assert FL Attain XC Barricade Benchmark Broadband Compitox Deploy ¹ DyVel ¹ DyVel DSp ¹ Frontline Heat ⁵ Infinity Mecoprop Nimble ¹ Optica Trio	Prestige XC Pulsar Refine M ¹ Refine SG ¹ Retain Spectrum Stellar Sword Target Tracker XP Triton C Trophy Tundra Unity	Accurate Ally Assert FL Attain XC ¹ Benchmark Broadband Compitox Deploy Express Pro Frontline Infinity Linuron 480 + MCPA	Lorox + MCPA Mecoprop Nimble Optica Trio Prestige XC ¹ Refine M Refine SG Retain Sencor Spectrum Triton C Tundra Unity	Achieve Liquid Gold Accurate Ally Approve Badge Benchmark Bromotril Brotex 240 Buctril M Curtail M Deploy Hoe-Grass II Koril Leader	Logic M Lontrel Mextrol Nimble Pardner Prestige XC Refine M Refine SG Retain Sencor Thrasher Thumper Titanium Triton C
Wheat (C - CLEARFIELD wheat)	Adrenalin SC ¹ (C) Altitude FX (C) Assert FL Attain XC Banvel II Barricade Basagran ² + 2,4-D Benchmark Broadband Compitox Cypress Deploy ¹ DyVel ¹ DyVel DSp ¹ Everest GBX Frontline Frontline 2,4-D Harmony K ^{1,2} Hawkeye Harmony Max ¹ Harmony SG ¹ Heat ⁵	Infinity Mecoprop Nimble ¹ Optica Trio Pace Prepare complete Prestige XC Pulsar Refine M ¹ Refine SG ¹ Retain Simplicity Spectrum Stellar Sword Target Tracker XP Triton C Trophy ² Tundra Unity Velocity m3	Adrenalin SC ¹ (C) Accurate Ally Altitude FX (C) Assert FL Attain XC ¹ Basagran ² + 2,4-D Benchmark Broadband Compitox Cypress Deploy Express Pro Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Infinity	Linuron 480 + MCPA Lorox + MCPA Mecoprop Nimble Optica Trio Pace Prepare complete Prestige XC ¹ Refine M Refine SG Retain Sencor Simplicity Spectrum Triton C Tundra Unity Velocity m3	Achieve Liquid Gold Adrenalin SC ¹ (C) Accurate Ally Approve Badge Basagran ² + 2,4-D Benchmark Bromotril Brotex 240 Buctril M Curtail M Deploy Harmony K ² Harmony Max Harmony SG Hoe-Grass II	Koril Leader Logic M Lontrel Mextrol Nimble Pardner Prestige XC Refine M Refine SG Retain Signal D Signal M Thrasher Thumper Titanium Triton C
Oats	Banvel II ⁵ Compitox Deploy ¹ DyVel ¹ Frontline Hawkeye ⁵ Heat ⁵ Mecoprop	Nimble ¹ Optica Trio Refine M ¹ Refine SG ¹ Spectrum Sword Target Tracker XP	Compitox Deploy Frontline Linuron 480 + MCPA Lorox + MCPA	Mecoprop Nimble Optica Trio Refine M Refine SG Spectrum	Badge Bromotril Brotex 240 Buctril M Curtail M Deploy Koril	Logic M Lontrel Mextrol Nimble Pardner Refine M Refine SG
Fall Rye (spring application)					Achieve Liquid Gold Badge Bromotril Brotex 240	Buctril M Logic M Mextrol Pardner
Triticale	Infinity		Infinity		Bromotril Brotex 240 Hoe-Grass II	Koril Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Cereals

Crop	Corn Spurry	Cow Cockle		Creeping Buttercup	Dandelion	Field Bindweed
Barley	Accurate Ally Banvel II Compitox Deploy DyVel DyVel DSp Hawkeye Linuron 480 + MCPA Lorox + MCPA Mecoprop Nimble Refine M Refine SG Retain Sencor Sword Target Tracker XP Triton C	Achieve Liquid Gold Accurate Advance 10G Ally Approve Badge Banvel II Barricade Benchmark Bromotril Brotex 240 Bonanza Buctril M Deploy DyVel DyVel DSp Express Pro Express SG FirstStep Hawkeye Hoe-Grass II Koril	Leader Logic M Linuron 480 + MCPA Lorox + MCPA Mextrol Nimble Nuance Pardner Refine M Refine SG Retain Rival 10G Spike-Up Sword Target Thrasher Thumper Titanium Tracker XP Triton C Triton K Unity	Clovitox Plus ¹ Topside ⁵ Tropotox Plus ⁵	Attain XC Cobutox 600 ¹ Caliber 400 ¹ Curtail M 2,4-D ¹ 2,4-DB ¹ Embutox 625 Express SG FirstStep Infinity ¹ MCPA amine ¹ MCPA ester ¹ MCPA K-salt Prestige XC Refine M Spectrum ¹ Spike-Up Tundra ¹	Attain XC Banvel II Caliber 400 ¹ Cobutox 600 ¹ Clovitox Plus ¹ DyVel DSp 2,4-DB ¹ Embutox 625 Hawkeye MCPA ¹ (all forms) Sword ⁵ Target ⁵ Topside ¹ Tracker XP ⁵ Tropotox Plus ¹
Wheat (C - CLEARFIELD wheat)	Accurate Ally Banvel II Basagran ² + 2,4-D Compitox Cypress Deploy DyVel DyVel DSp Harmony K ² Harmony Max Harmony SG Hawkeye Linuron 480 + MCPA Lorox + MCPA Mecoprop Nimble Refine M Refine SG Retain Sencor Sword Target Tracker XP Triton C	Achieve Liquid Gold Accurate Adrenalin SC (C) Ally Altitude FX (C) Approve Badge Banvel II Barricade Benchmark Bromotril Brotex 240 Buctril M Cypress Deploy DyVel DyVel DSp Express SG Express Pro FirstStep Harmony K ² Harmony Max Harmony SG Hawkeye Hoe-Grass II	Koril Leader Logic M Linuron 480 + MCPA Lorox + MCPA Mextrol Nimble Pace Pardner Prepare Complete Refine M Refine SG Retain Signal M Spike-Up Sword Target Thrasher Thumper Titanium Tracker XP Triton C Triton K Unity	Clovitox Plus ¹ Topside ⁵ Tropotox Plus ⁵	Adrenalin SC ¹ (C) Attain XC Caliber 400 ¹ Cobutox 600 ¹ Curtail M Dichlorprop D/DX 2,4-D ¹ 2,4-DB ¹ Embutox 625 Etaprop Plus Etaprop XT Express SG FirstStep Frontline 2,4-D Harmony K Infinity ¹ MCPA Amine ¹ MCPA Ester ¹ MCPA K-salt Pace Prepare Complete Prestige XC Refine M Spectrum ¹ Spike-Up Tundra ¹ Velocity m3 ¹	Adrenalin SC ⁵ (C) Attain XC Banvel II Basagran + 2,4-D ^{1,2} Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ DyVel DSp 2,4-DB ¹ Embutox 625 Hawkeye MCPA ¹ (all forms) Sword ⁵ Target ⁵ Topside ¹ Tracker XP ⁵ Tropotox Plus ¹
Oats	Banvel II Compitox Deploy DyVel Hawkeye Linuron 480 + MCPA Lorox + MCPA Mecoprop Nimble Refine M Refine SG Reglone Sword Target Tracker XP	Badge Banvel II Bromotril Brotex 240 Buctril M Hawkeye DyVel Koril Linuron 480 + MCPA Lorox + MCPA	Logic M Mextrol Pardner Refine M Refine SG Sword Target Tracker XP	Clovitox Plus ¹ Topside ⁵ Tropotox Plus ⁵	Caliber 400 ¹ Cobutox 600 ¹ Curtail M 2,4-DB ¹ Embutox 625 MCPA Amine ¹ MCPA Ester ¹ MCPA K-salt Refine M Spectrum ¹	Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ 2,4-DB ¹ Embutox 625 MCPA ¹ (all forms) Sword ⁵ Target ⁵ Tracker XP ⁵ Topside ¹ Tropotox Plus ¹
Fall Rye (spring application)		Achieve Liquid Gold Badge Bromotril Brotex 240	Buctril M Logic M Mextrol Pardner	Clovitox Plus ¹ Topside ⁵ Tropotox Plus ⁵	2,4-D ¹ MCPA Amine ¹ MCPA Ester ¹ MCPA K-salt	Clovitox Plus ¹ MCPA ¹ (all forms) Topside ¹ Tropotox Plus ¹
Triticale		Bromotril Brotex 240 Hoe-Grass II	Koril Pardner		Infinity ¹	

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart – Cereals

Crop	Field Horsetail	Flixweed			Green Foxtail ⁴	
Barley	Attain ⁵ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ 2,4-DB ¹ 2,4-DB ¹ Embutox 625 MCPA ¹ (all forms) Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Accurate Ally Approve Assert FL Attain XC Badge Banvel II + 2,4-D Banvel II + MCPA Buctril M Curtail M Dichlorprop D/DX Deploy DyVel DyVel DSp	2,4-D Estoprop Plus Estoprop XT Express SG Express Pro FirstStep Frontline Infinity Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Nimble Nuance Prestige XC	Spectrum Refine M ¹ Refine SG Spike-Up Stellar S-word Target Thrasher Thumper Titanium Tracker XP Triton C Triton K Trophy Tundra Turboprop Unity	Achieve Liquid Gold Advance 10G Axial Bison Bonanza Broadband Cordon Express SG Express Pro FirstStep Fortress Hoe-Grass II	Liquid Achieve SC Marengo Lorox ¹ Puma ²⁰ Super Puma Advance Rival 500 Spike-Up Titanium Treflan EC Triton C ¹ Tundra WildCat
Wheat (C - CLEARFIELD wheat)	Adrenalin SC ¹ (C) Attain ⁵ Caliber 400 ¹ Clovitox Plus Cobutox 600 ¹ 2,4-DB ¹ Embutox 625 ¹ Everest GBX ¹ MCPA ¹ (all forms) Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Adrenalin SC (C) Accurate Ally Altitude FX (C) Assert FL Attain XC Approve Badge Banvel II + 2,4-D Banvel II + MCPA Buctril M Curtail M Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D Estoprop Plus Estoprop XT	Everest GBX Express SG Express Pro FirstStep Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Infinity Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Nimble Nuance Pace Prepare Complete Prestige XC	Refine M ¹ Refine SG Signal D Signal M Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C Triton K Trophy ² Tundra Turboprop Unity Velocity m3	Achieve Liquid Gold Adrenalin SC (C) Advance 10G Altitude FX (C) Aurora Axial Bengal Bison Bonanza Broadband Cordon Cypress Everest Everest GBX Express SG Express Pro FirstStep Fortress Harmony K ² Harmony Max Harmony SG Foothills Hoe-Grass II Horizon NG	Ladder Liquid Achieve SC Lorox ¹ Marengo Nextstep Pace Prepare Complete Puma ²⁰ Super Puma Advance Rival 500 Signal Signal D Signal M Simplicity ¹ Spike-Up Titanium Traxos Treflan EC Triton C ¹ Velocity m3 Tundra Vigil WildCat
Oats	Caliber ¹ Clovitox Plus ¹ Cobutox 600 ¹ 2,4-DB ¹ Embutox 625 MCPA ¹ (all forms) Topside ⁵ Tropotox Plus ⁵	Badge Banvel II + 2,4-D Banvel II + MCPA Buctril M Curtail M Deploy	DyVel Frontline Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms)	Mextrol Nimble Refine M ¹ Refine SG Spectrum Sword Target Tracker XP	Linuron 480 + MCPA ¹	Lorox ¹ Lorox + MCPA ¹
Fall Rye (spring application)	Clovitox Plus ¹ MCPA ¹ (all forms) Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Badge	Buctril M 2,4-D Logic M	MCPA (all forms) Mextrol	Achieve Liquid Gold Liquid Achieve SC	Bison Marengo
Triticale		Infinity			Hoe-Grass II Liquid Achieve SC	Bison Marengo

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Cereals

Crop	Hemp-nettle		Knotweed	Kochia ⁴		
Barley	Accurate Ally Assert FL Attain XC ¹ Banvel II + MCPA K-salt Barricade Benchmark ¹ Broadband ¹ Clovitox Plus ¹ Deploy DyVel Express SG FirstStep Frontline Infinity Linuron 480 + MCPA Lorox + MCPA	MCPA ¹ (all forms) Nimble Prestige XC ¹ Refine M Refine SG Retain Sencor Spectrum Spike-Up Stellar Sword Target Topside Triton C Tracker XP Trophy Tropotox Plus Tundra Unity	Advance 10G Bonanza DyVel DSp Rival 10G Sword Target Tracker XP Treflan QR5	Achieve Liquid Gold Accurate Ally Approve Assert FL Attain XC Badge Banvel II + 2,4-D Banvel II + MCPA Barricade Benchmark Bromotril Brotex 240 Buctril M Curtail M ¹ Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D	Estaprop Plus Estaprop XT Express SG Express Pro FirstStep Fortress Frontline Heat ⁸ Hoe-Grass II Infinity Koril Leader Logic M MCPA amine MCPA ester MCPA K-salt Mextrol Nimble Nuance Optica Trio Pace Pardner	Prepare Complete Prestige XC Pulsar Refine M Refine SG Retain Spike-Up Stellar Sword Target Thrasher Thumper Titanium Triton C Triton K Tracker XP Trophy Tundra Turboprop Unity
Wheat (C - CLEARFIELD wheat)	Adrenalin SC ¹ (C) Accurate Ally Altitude FX (C) Assert FL Attain XC ¹ Banvel II + MCPA K-salt Barricade Benchmark ¹ Broadband ¹ Clovitox Plus ¹ Cypress Deploy DyVel Express SG FirstStep Frontline Frontline 2,4-D ¹ Harmony K ² Harmony SG Harmony Max Infinity Linuron 480 + MCPA	Lorox + MCPA MCPA ¹ (all forms) Nimble Pace Prepare Complete Prestige XC ¹ Refine M Refine SG Retain Sencor Simplicity Spectrum Spike-Up Stellar Sword Target Topside Triton C Tracker XP Trophy ² Tropotox Plus Tundra Unity Velocity m3	Adrenalin SC ¹ (C) DyVel DSp Sword Target Tracker XP	Achieve Liquid Gold Accurate Adrenalin SC (C) Ally Altitude FX (C) Approve Assert FL Attain XC Badge Banvel II + 2,4-D Banvel II + MCPA Barricade Benchmark Bromotril Brotex 240 Buctril M Curtail M ¹ Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp	2,4-D Estaprop Plus Estaprop XT Everest GBX Express SG Express Pro FirstStep Fortress ¹ Frontline Frontline 2,4-D Harmony K ² Harmony SG Harmony Max Hoe-Grass II Infinity Koril Leader Logic M MCPA amine MCPA ester MCPA K-salt Mextrol Nimble Nuance	Optica Trio Pardner Prestige XC Pulsar Refine M Refine SG Retain Signal D Signal M Spike-Up Stellar Sword Target Thrasher Thumper Titanium Triton C Triton K Tracker XP Trophy ² Tundra Turboprop Unity Velocity m3
Oats	Banvel II + MCPA K-salt Clovitox Plus ¹ Deploy DyVel Frontline Linuron 480 + MCPA ¹ Lorox + MCPA ¹	MCPA ¹ (all forms) Nimble Refine M Refine SG Spectrum Sword Target Topside Tracker XP Tropotox Plus	Sword Target Tracker XP	Badge Banvel II + 2,4-D Banvel II + MCPA Bromotril Brotex 240 Buctril M Curtail M ¹	Deploy DyVel Frontline Heat ⁸ Koril Logic M MCPA amine MCPA ester MCPA K-salt	Mextrol Nimble Optica trio Pardner Refine M Refine SG Sword Target Tracker XP
Fall Rye (spring application)	Clovitox Plus ¹ MCPA ¹ (all forms)	Topside Tropotox Plus		Achieve Liquid Gold Badge Bromotril Brotex 240	Buctril M 2,4-D Logic M MCPA amine	MCPA ester MCPA K-salt Mextrol Pardner
Triticale	Infinity			Bromotril Brotex 240	Infinity Koril	Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information

⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart - Cereals

Crop	Lady's Thumb/Annual Smartweed			Lamb's-quarters		
Barley	Achieve Liquid Gold Accurate Ally Approve Assert FL Attain XC Badge Banvel II Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400 ¹ Cobutox 600 ¹ Deploy Dichlorprop D/DX DyVel DyVel DSp	2,4-D 2,4-DB ¹ Embutox 625 ¹ Estoprop Plus Estoprop XT Express SG Express Pro FirstStep Hawkeye Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Pardner	Prestige XC Refine M Refine SG Retain Sencor Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C Tundra Turboprop Unity	Achieve Liquid Gold Accurate ¹ Advance 10G Ally ¹ Approve Assert FL Attain XC Badge Barricade Benchmark Bonanza Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB	Embutox 625 Estoprop Plus Estoprop XT Express SG Express Pro FirstStep Frontline Fortress ¹ Heat ⁴ Hoe-Grass II Infinity Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mecoprop Mextrol Nimble Nuance Optica Trio Pardner	Prestige XC Pulsar Refine M Refine SG Retain Rival 10G Sencor Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Tropotox Plus Triton C Triton K Trophy Tundra Turboprop Unity
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Accurate Adrenalin SC (C) Ally Approve Assert FL Attain XC Badge Banvel II Barricade Basagran ² + 2,4-D Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400 ¹ Cobutox 600 ¹ Crossfire ² Curtail M Cypress Deploy Dichlorprop D/DX DyVel	DyVel DSp 2,4-D 2,4-DB ¹ Embutox 625 Estoprop Plus Estoprop XT Everest GBX Express SG Express Pro FirstStep Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Pace	Pardner Prepare Complete Prestige XC Refine M Refine SG Retain Sencor Signal D Signal M Simplicity Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C Trophy ² Tundra Turboprop Unity	Achieve Liquid Gold Accurate ¹ Adrenalin SC (C) Ally ¹ Altitude FX (C) Approve Assert FL Attain XC Badge Banvel II Barricade Basagran ² + 2,4-D Benchmark Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB Fortress ¹	Frontline Frontline 2,4-D Embutox 625 Estoprop Plus Estoprop XT Everest GBX Express SG Express Pro FirstStep Harmony K ² Harmony Max Harmony SG Hawkeye Heat ⁴ Hoe-Grass II Infinity Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mecoprop Mextrol Nimble Nuance Optica Trio	Pace Pardner Prepare Complete Prestige XC Pulsar ¹ Refine M Refine SG Sencor Signal D Signal M Spectrum Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Triton C Triton K Trophy ² Tropotox Plus Tundra Turboprop Unity Velocity m3
Oats	Badge Banvel II Bromotril Brotex 240 Buctril M Caliber 400 ¹ Cobutox 600 ¹ Curtail M Deploy	DyVel Embutox 625 Frontline Hawkeye Koril Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms)	Mextrol Nimble Pardner Refine M Refine SG Spectrum Sword Target Tracker XP	Badge Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Deploy DyVel 2,4-DB Fortress ¹	Embutox 625 Frontline Heat ⁴ Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mecoprop Mextrol Nimble	Optica Trio Pardner Refine M Refine SG Spectrum Sword Target Topside Tracker XP Tropotox Plus
Fall Rye (spring application)	Achieve Liquid Gold Badge Bromotril Brotex 240	Buctril M 2,4-D Koril Logic M	MCPA ¹ (all forms) Mextrol Pardner	Achieve Liquid Gold Badge Bromotril Brotex 240 Buctril M	Clovitox Plus 2,4-D Koril Logic M MCPA (all forms)	Mextrol Pardner Topside Tropotox Plus
Triticale	Bromotril Brotex 240	Koril	Pardner	Bromotril Brotex 240	Hoe-Grass II Infinity	Koril Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart - Cereals

Crop	Leafy Spurge	Narrow-leaved Hawk's-beard	Night-flowering Catchfly	Perennial Sow-thistle		
Barley	Attain XC 2,4-D MCPA ¹ (all forms)	Ally + 2,4-D Caliber 400 Cobutox 600 Deploy 2,4-D 2,4-DB Embutox 625 Express SG Express Pro FirstStep Heat ⁴ Nimble Nuance Refine M Refine SG Retain Spike-Up Triton C Triton K	Achieve Liquid Gold Approve Badge Buctril M Dichlorprop D/DX Estoprop Plus Estoprop XT Hoe-Grass II Leader Logic M Mextrol Sencor Sword Target Thrasher Thumper Titanium Tracker XP Turboprop	Achieve Liquid Gold ¹ Accurate ¹ Ally ¹ Assert FL ¹ Attain XC ¹ Badge ¹ Banvel II ⁵ Benchmark ¹ Broadband ¹ Buctril M ¹ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ Curtail M ³	Deploy ¹ Dichlorprop D/DX ⁵ DyVel ⁶ 2,4-D ¹ 2,4-DB ¹ Embutox 625 Estoprop Plus ⁵ Estoprop XT ⁵ Frontline ¹ Hawkeye ⁵ Infinity ¹ Logic M ¹ Lontrel ⁵ MCPA ¹ (all forms) Mextrol ⁵	Nimble Prestige XC ⁵ Refine M ¹ Refine SG ¹ Retain ¹ Spectrum ¹ Sword ⁵ Target ⁵ Titanium ¹ Topside ¹ Tracker XP ⁵ Triton C ¹ Tropotox Plus ¹ Tundra ¹ Turboprop ¹
Wheat (C - CLEARFIELD wheat)	Adrenalin SC ¹ (C) Attain XC 2,4-D MCPA ¹ (all forms)	Ally Caliber 400 Cobutox 600 Deploy 2,4-D ¹ 2,4-DB Embutox 625 Express SG Express Pro FirstStep Harmony K ² Harmony Max Harmony SG Heat ⁴ Nimble ^{1a} Nuance Pace Prepare Complete Refine M Refine SG Retain Spike-Up Triton C Triton K	Achieve Liquid Gold Adrenalin SC (C) Approve Badge Buctril M Cypress Dichlorprop D/DX Estoprop Plus Retain Spike-Up Hoe-Grass II Leader Logic M Mextrol Sencor Signal D Signal M Sword Target Thrasher Thumper Titanium Tracker XP Turboprop	Achieve Liquid Gold ¹ Accurate ¹ Adrenalin SC ¹ (C) Ally ¹ Assert FL ¹ Attain XC ¹ Badge ¹ Banvel II ⁵ Benchmark ¹ Broadband ¹ Buctril M ¹ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ Curtail M ³ Deploy ¹	Dichlorprop D/DX ⁵ DyVel ⁶ 2,4-DB ¹ Embutox 625 Estoprop Plus ⁵ Estoprop XT ⁵ Frontline ¹ Frontline 2,4-D ⁵ Harmony K ^{1,2} Harmony Max ¹ Harmony SG ¹ Hawkeye ⁵ Infinity ¹ Logic M ¹ Lontrel ⁵ MCPA ¹ (all forms) Mextrol ⁵	Nimble Prestige XC Refine M ¹ Refine SG ¹ Retain ¹ Signal M ¹ Spectrum ¹ Sword ⁵ Target ⁵ Titanium ¹ Topside ¹ Tracker XP ⁵ Triton C ¹ Tropotox Plus ¹ Tundra ¹ Turboprop ¹ Velocity m3 ¹
Oats	MCPA ¹ (all forms)	Caliber 400 Cobutox 600 Deploy 2,4-DB Embutox 625 Heat ⁴ Nimble Refine M Refine SG	Badge Buctril M Logic M Mextrol Sword Target Tracker XP	Badge ¹ Banvel II ⁵ Buctril M ¹ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ Curtail M ³ Deploy ¹ DyVel ⁶	2,4-DB ¹ Embutox 625 Frontline ¹ Hawkeye ⁵ Logic M ¹ Lontrel ⁵ MCPA ¹ (all forms) Mextrol ⁵ Nimble ¹	Refine M ¹ Refine SG ¹ Spectrum ¹ Sword ⁵ Target ⁵ Topside ¹ Tracker XP ⁵ Tropotox Plus ¹
Fall Rye (spring application)	2,4-D MCPA ¹ (all forms)	2,4-D ¹	Achieve Liquid Gold Badge Buctril M Logic M Mextrol	Achieve Liquid Gold ¹ Badge ¹ Buctril M ¹	Clovitox Plus ¹ Logic M ¹ MCPA ¹ (all forms)	Mextrol ⁵ Topside ¹ Tropotox Plus ¹
Triticale			Hoe-Grass II	Infinity ¹		

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information

⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart - Cereals

Crop	Persian Darnel	Prostrate Pigweed	Quack Grass	Ragweed		
Barley	Achieve Liquid Gold Advance 10G Bison Bonanza Express SG Express Pro FirstStep Hoe-Grass II Liquid Achieve SC Marengo Rival 10G Spike-Up Titanium Treflan QR5	Accurate Ally DyVel DyVel DSp 2,4-D MCPA K-salt Sword Target Tracker XP	Glyphosate* (pre-harvest)	Achieve Liquid Gold Approve Assert FL Attain XC Badge Benchmark Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Dichlorprop D/DX DyVel DyVel DSp 2,4-D	2,4-DB Embutox 625 Estoprop Plus Estoprop XT Express SG FirstStep Frontline Infinity Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Optica Trio	Pardner Refine SG + MCPA Spike-Up Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Trophy Tropotox Plus Turboprop
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Adrenalin SC (C) Altitude FX (C) Aurora Bison Express SG Express Pro FirstStep Foothills Hoe-Grass II Horizon NG Ladder Liquid Achieve SC Marengo Nextstep Pace Prepare Complete Signal Signal D Spike-Up Titanium Traxos Velocity m3 ¹	Adrenalin SC ¹ (C) Accurate Ally Cypress DyVel DyVel DSp 2,4-D MCPA K-salt Sword Target Tracker XP	Glyphosate* (pre-harvest)	Achieve Liquid Gold Adrenalin SC (C) Approve Assert FL Attain XC Badge Basagran ² Benchmark Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Cypress Dichlorprop D/DX DyVel DyVel DSp 2,4-D	2,4-DB Embutox 625 Estoprop Plus Estoprop XT Everest GBX Express SG FirstStep Frontline Frontline 2,4-D Horizon BTM Infinity Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Optica Trio	Pace Pardner Prepare Complete Refine SG + MCPA Signal D Signal M Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Trophy ³ Tropotox Plus Turboprop
Oats		DyVel MCPA K-salt Sword Target Tracker XP	Glyphosate* (pre-harvest)	Badge Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 DyVel 2,4-DB	Frontline Embutox 625 Koril Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol	Optica Trio Pardner Refine SG + MCPA Sword Target Topside Tracker XP Tropotox Plus
Fall Rye (spring application)	Achieve Liquid Gold Bison Liquid Achieve SC Marengo	2,4-D MCPA K-salt		Achieve Liquid Gold Badge Bromotril Brotex 240	Buctril M Clovitox Plus 2,4-D Koril Logic M	MCPA (all forms) Mextrol Pardner Topside Tropotox Plus
Triticale	Bison Hoe-Grass II Liquid Achieve SC Marengo			Bromotril Brotex 240	Infinity Koril	Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart - Cereals

Crop	Redroot Pigweed			Round-leaved Mallow	Russian Pigweed
Barley	Achieve Liquid Gold Accurate Ally Approve Assert FL Attain XC Badge Banvel II Barricade Benchmark Broadband ¹ Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Deploy DyVel DyVel DSp 2,4-D 2,4-DB Embutox 625	Estapro Plus Estapro XT Express SG Express Pro FirstStep Fortress ¹ Frontline Hawkkeye Heat ⁴ Infinity Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Nuance Optica Trio Pardner Prestige XC Pulsar ¹	Refine M Refine SG Retain Sencor Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Triton C Triton K Trophy Tropotox Plus Tundra Turboprop Unity	Attain XC Deploy ¹ Dichlorprop DyVel DSp ¹ Estapro Plus Infinity ¹ Nimble ¹ Prestige XC Refine M ¹ Refine SG ¹ Retain ¹ Triton C Turboprop ⁵	Ally + 2,4-D Ally + MCPA Assert FL Banvel II Curtail M Dichlorprop D/DX DyVel 2,4-D Estapro Plus Estapro XT Express Pro Frontline Hawkkeye MCPA (all forms) Nuance Prestige XC Refine SG + Mixes Stellar Triton K Turboprop
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Adrenalin SC (C) Accurate Ally Altitude FX (C) Approve Assert FL Attain XC Badge Banvel II Barricade Basagran ² + 2,4-D Benchmark Broadband ¹ Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB	Embutox 625 Estapro Plus Estapro XT Everest Everest GBX Express SG Express Pro FirstStep Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Hawkkeye Heat ⁴ Infinity Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol Optica Trio Pace Prepare Complete Nimble Nuance	Prestige XC Pulsar ¹ Refine M Refine SG Retain Sencor Signal D Signal M Simplicity Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP ¹ Triton C Triton K Trophy ² Tropotox Plus Tundra Turboprop Unity Velocity m3	Altitude FX ¹ (C) Attain XC Deploy ¹ Dichlorprop ³ DyVel DSp ¹ Estapro Plus Estapro XT Harmony K ^{1,2} Harmony Max ¹ Harmony SG ¹ Heat ⁴ Infinity ¹ Nimble ¹ Prestige XC Refine M ¹ Refine SG ¹ Retain ¹ Triton C Turboprop ⁵	Adrenalin SC (C) Ally + Mixes Assert FL Curtail M Dichlorprop D/DX DyVel 2,4-D Estapro Plus Estapro XT Express SG Express Pro Frontline MCPA (all forms) Nuance Prestige XC Refine SG + 2,4-D Refine SG + MCPA Stellar Triton K Turboprop Velocity m3
Oats	Badge Banvel II Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600 Curtail M Deploy DyVel	2,4-DB Embutox 625 Frontline Hawkkeye Heat ⁴ Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms)	Mextrol Nimble Refine M Refine SG Spectrum Sword Target Topside Tracker XP Tropotox Plus	Deploy ¹ Nimble ¹ Refine M ¹ Refine SG ¹	Banvel II Curtail M DyVel Frontline MCPA (all forms)
Fall Rye (spring application)	Achieve Liquid Gold Badge Brotex 240	Buctril M Clovitox Plus 2,4-D Logic M	MCPA ¹ (all forms) Mextrol Topside Tropotox Plus		2,4-D MCPA (all forms)
Triticale	Infinity			Infinity ¹	

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart - Cereals

Crop	Russian Thistle ⁴		Scentless Chamomile	Shepherd's-purse		
Barley	Achieve Liquid Gold	Infinity	Achieve Liquid Gold	Achieve Liquid Gold	Deploy	Nuance
	Accurate ¹	Koril	Accurate	Accurate	Dichlorprop D/DX	Prestige XC
	Ally ¹	Leader	Ally	Ally	DyVel	Refine M
	Approve	Logic M	Badge	DyVel DSp	2,4-D	Refine SG
	Attain XC	Mextrol	Buctril M	Assort FL	2,4-DB	Retain
	Badge	Nimble	Curtail M	Attain XC	Embutox 625	Spectrum
	Barricade ¹	Pardner	Deploy ¹	Badge	Estoprop Plus	Stellar
	Benchmark	Pulsar	Express SG ¹	Banvel II +	Estoprop XT	Sword
	Bromotril	Refine M	FirstStep ¹	2,4-D	Express SG	Target
	Brotex 240	Refine SG	Hoe-Grass II	Banvel II +	Express Pro	Thrasher
	Buctril M	Retain	Logic M	MCPA	Frontline	Thumper
	Deploy	Rival 10G	Lontrel	Benchmark	Infinity	Titanium
	Dichlorprop D/DX	Sencor	Mextrol	Broadband	Leader	Topside
	DyVel	Spike-Up	Nimble	Buctril M	Linuron 480 +	Tracker XP
	DyVel DSp	Target	Prestige XC	Caliber 400	MCPA	Triton C
	2,4-D	Thrasher	Refine M ¹	Clovitox Plus	Logic M	Triton K
Estoprop Plus	Thumper	Refine SG ¹	Cobutox 600	Lorox + MCPA	Trophy	
Estoprop XT	Titanium	Retain ¹	Curtail M	MCPA (all forms)	Tropotox Plus	
Express SG	Tracker XP	Spike-Up ¹		Mextrol	Tundra	
Express Pro	Triton C	Titanium		Nimble	Turboprop	
FirstStep	Tundra	Triton C ¹			Unity	
Nuance	Turboprop					
Fortress ¹						
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold	Harmony Max	Achieve Liquid Gold	Achieve Liquid Gold	DyVel DSp	Prepare
	Accurate ¹	Hawkeye	Gold	Gold	2,4-D	Complete
	Adrenalin SC (C)	Infinity	Accurate	Accurate	2,4-DB	Prestige XC
	Ally ¹	Koril	Ally	Adrenalin SC (C)	Embutox 625	Refine M
	Altitude FX ¹ (C)	Leader	Badge	Ally	Estoprop Plus	Refine SG
	Approve	Logic M	Buctril M	Altitude FX (C)	Estoprop XT	Retain
	Attain XC	Mextrol	Curtail M	Approve	Everest GBX	Sencor
	Badge	Nimble	Deploy ¹	Assert FL	Everest ¹	Signal D
	Banvel II	Nuance	Express SG ¹	Attain XC	Express SG	Signal M
	Barricade ¹	Pace	FirstStep ¹	Badge	Express Pro	Spectrum
	Basagran ² +	Pardner	Harmony Max ¹	Banvel II +	Frontline	Stellar
	2,4-D	Prepare	Hoe-Grass II	2,4-D	Frontline 2,4-D	Sword
	Benchmark	Complete	Logic M	Banvel II +	Harmony K ²	Target
	Bromotril	Pulsar	Lontrel	MCPA	Harmony Max	Thrasher
	Brotex 240	Refine M	Mextrol	Basagran ² +	Harmony SG	Thumper
	Buctril M	Refine SG	Nimble	2,4-D	Infinity	Titanium
	Cypress	Retain	Prestige XC	Benchmark	Leader	Topside
	Deploy	Sencor	Refine M ¹	Broadband	Linuron 480 +	Tracker XP
	Dichlorprop D/DX	Signal D	Refine SG ¹	Buctril M	MCPA	Triton C
	DyVel	Signal M	Retain ¹	Caliber 400	Logic M	Triton K
	DyVel DSp	Spike-Up	Signal M	Clovitox Plus	Lorox + MCPA	Trophy ²
	2,4-D	Sword	Spike-Up ¹	Cobutox 600	MCPA (all forms)	Tropotox Plus
	Estoprop Plus	Target	Titanium	Curtail M	Mextrol	Tundra
	Estoprop XT	Thrasher	Triton C ¹	Cypress	Nimble	Turboprop
	Express SG	Thumper		Deploy	Nuance	Unity
	Express Pro	Titanium		Dichlorprop D/DX	Pace	Velocity m3
FirstStep	Tracker XP		DyVel			
Fortress ¹	Triton C					
Frontline 2,4-D	Tundra					
Harmony K ²	Turboprop					
Harmony SG	Velocity m3					
Oats	Badge	Mextrol	Badge	Badge	Embutox 625	Refine M
	Bromotril	Nimble	Buctril M	Buctril M	Frontline	Refine SG
	Brotex 240	Pardner	Curtail M	Caliber 400	Linuron 480 +	Spectrum
	Buctril M	Refine M	Deploy ¹	Clovitox Plus	MCPA	Sword
	Deploy	Refine SG	Logic M	Cobutox 600	Logic M	Target
	DyVel	Sword	Lontrel	Curtail M	Lorox + MCPA	Topside
	Koril	Target	Mextrol	Deploy	MCPA (all forms)	Tracker XP
	Logic M	Tracker XP	Nimble	DyVel	Mextrol	Tropotox Plus
		Refine M ¹	2,4-DB	Nimble		
		Refine SG ¹				
Fall Rye (spring application)	Achieve Liquid Gold	2,4-D	Achieve Liquid Gold	Achieve Liquid Gold	Clovitox Plus	Mextrol
	Badge	Koril	Badge	Gold	2,4-D	Topside
	Bromotril	Logic M	Buctril M	Badge	Logic M	Tropotox Plus
	Brotex 240	Mextrol	Logic M	Buctril M	MCPA (all forms)	
Buctril M	Pardner	Mextrol				
Triticale	Bromotril	Koril	Hoe-Grass II	Infinity		
	Brotex 240	Pardner				
	Infinity					

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart - Cereals

Crop	Stinkweed				Stork's-bill	
Barley	Achieve Liquid Gold Accurate Ally Approve Assert Assert FL Attain XC Avert Badge Barricade Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus Cobutox 600	Curtail M Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB Embutox 625 Estoprop Plus Estoprop XT Express SG Express Pro FirstStep Frontline Heat ⁵ Hoe-Grass II Infinity	Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Nimble Nuance Optica Trio Pardner Prestige XC Refine M Refine SG Sencor Spectrum Spike-Up	Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Triton C Triton K Trophy Tropotox Plus Tundra Turboprop Unity	Accurate Ally Assert FL ¹ Attain XC Deploy ¹ Dichlorprop D/DX Estoprop Plus Estoprop XT Frontline ¹ Linuron 480 + MCPA	Lorox + MCPA Nimble ¹ Prestige XC Pulsar ¹ Refine M ¹ Refine SG ¹ Retain ¹ Spectrum Stellar ¹ Triton C ¹ Trophy ¹ Turboprop
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Accurate Adrenalin SC (C) Ally Altitude FX (C) Approve Assert Assert FL Attain XC Avert Badge Banvel II + Sencor Barricade Basagran ² + 2,4-D Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus	Cobutox 600 Curtail M Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D 2,4-DB Embutox 625 Estoprop Plus Estoprop XT Everest Everest GBX Express SG Express Pro FirstStep Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG	Heat ⁵ Hoe-Grass II Infinity Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Nimble Nuance Optica Trio Pace Pardner Prepare Complete Prestige XC Refine M Refine SG Sencor Signal D Signal M	Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Topside Tracker XP Triton C Triton K Trophy ² Tropotox Plus Tundra Turboprop Unity Velocity m3	Accurate Ally Altitude FX ¹ (C) Assert FL ¹ Attain XC Basagran ² + 2,4-D Deploy ¹ Dichlorprop D/DX Estoprop Plus Estoprop XT Frontline ¹ Harmony K ^{1,2} Harmony Max ¹	Harmony SG ¹ Linuron 480 + MCPA Lorox + MCPA Nimble ¹ Prestige XC Pulsar ¹ Refine M ¹ Refine SG ¹ Retain ¹ Spectrum Stellar ¹ Triton C ¹ Trophy ^{1,2} Turboprop
Oats	Badge Banvel II Bromotril Brotex 240 Buctril M Caliber 400 Clovitox Plus	Cobutox 600 Curtail M Deploy DyVel 2,4-DB Embutox 625 Frontline Hawkeye Heat ⁵ Koril	Linuron 480 + MCPA Logic M Lorox + MCPA MCPA (all forms) Mextrol Nimble Optica Trio Pardner	Refine M Refine SG Spectrum Sword Target Topside Tracker XP Tropotox Plus	Deploy ¹ Frontline ¹ Linuron 480 + MCPA	Lorox + MCPA Nimble ¹ Refine M ¹ Refine SG ¹ Spectrum
Fall Rye (spring application)	Achieve Liquid Gold Badge Bromotril	Brotex 240 Buctril M Clovitox Plus 2,4-D	Koril Logic M MCPA (all forms) Mextrol	Pardner Topside Tropotox Plus		
Triticale	Bromotril Brotex 240	Hoe-Grass II Infinity	Koril	Pardner		

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information
⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide**Herbicide Selector Chart - Cereals**

Crop	Tall Buttercup	Tartary Buckwheat			Toadflax
Barley	Clovitox Plus ¹ MCPA amine MCPA Na-salt Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Accurate Ally Approve Assert ¹ Attain XC Avert ¹ Badge Banvel II Benchmark Bromotril Brotex 240 Buctril M Curtail M Deploy	Dichlorprop D/DX DyVel DyVel DSp Estoprop Plus Estoprop XT Hawkeye Hoe-Grass II Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol	Nimble Pardner Prestige XC Refine M Refine SG Sencor Sword Target Thrasher Thumper Titanium Tracker XP Triton C Turboprop	Accurate ¹ Ally ¹ Deploy ¹ Estoprop Plus ¹ Estoprop XT ¹ Nimble ¹ Refine M ¹ Refine SG ¹ Retain ¹ Triton C ¹ Turboprop ¹
Wheat (C - CLEARFIELD wheat)	Clovitox Plus ¹ MCPA amine MCPA Na-salt Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Accurate Adrenalin SC ⁵ (C) Ally Approve Assert ¹ Attain XC Avert ¹ Badge Banvel II Benchmark Bromotril Brotex 240 Buctril M Curtail M Cypress Deploy Dichlorprop D/DX	DyVel DyVel DSp Estoprop Plus Estoprop XT Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Hawkeye Hoe-Grass II Koril Leader Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol	Nimble Pardner Prestige XC Refine M Refine SG Sencor Signal D Signal M Sword Target Thrasher Thumper Titanium Tracker XP Triton C Turboprop	Accurate ¹ Ally ¹ Deploy ¹ Estoprop Plus ¹ Estoprop XT ¹ Harmony K ^{1,2} Harmony SG ¹ Nimble ¹ Refine M ¹ Refine SG ¹ Retain ¹ Triton C ¹ Turboprop ¹
Oats	Clovitox Plus ¹ MCPA amine MCPA Na-salt Topside ⁵ Tropotox Plus ⁵	Badge Banvel II Bromotril Brotex 240 Buctril M Curtail M Deploy DyVel	Hawkeye Koril Linuron 480 + MCPA Logic M Lorox + MCPA MCPA ¹ (all forms) Mextrol	Nimble Pardner Refine M Refine SG Sword Target Tracker XP	Deploy ¹ Nimble ¹ Refine M ¹ Refine SG ¹
Fall Rye (spring application)	Clovitox Plus ¹ MCPA amine MCPA Na-salt Topside ⁵ Tropotox Plus ⁵	Achieve Liquid Gold Badge Bromotril	Brotex 240 Buctril M Koril Logic M	MCPA ¹ (all forms) Mextrol Pardner	
Triticale		Bromotril Brotex 240	Hoe-Grass II Koril	Pardner	

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart – Cereals

Crop	Volunteer Canola, Wild Mustard, Other Mustards			Wild Buckwheat		
Barley	Achieve Liquid Gold Accurate Ally Altitude FX (C) Approve Assert FL Attain XC Badge Banvel II + 2,4-D Banvel II + MCPA Barricade Benchmark ³ Broadband Buctril M Clovitox Plus Curtail M Deploy	Dichlorprop D/DX DyVel DyVel DSp 2,4-D Estoprop Plus Estoprop XT Express SG (canola) Express Pro (canola) FirstStep Frontline Heat ⁴ Hoe-Grass II Infinity Leader Logic M Mextrol Nimble Optica Trio	Prestige XC Refine SG Retain Sencor Spectrum Spike-Up Stellar Sword Target Thrasher Titanium Tracker XP Triton C ⁵ Triton K Tropotox Plus Tundra Turboprop Unity	Achieve Liquid Gold Accurate ¹ Advance Ally ¹ Approve Assert ¹ Assert FL Attain XC Avert ¹ Badge Banvel II Barricade Benchmark Bonanza Broadband Bromotril Brotex 240 Buctril M Caliber 400 Cobutox 600 Crossfire ¹ Curtail M Deploy Dichlorprop D/DX DyVel	DyVel DSp 2,4-D ¹ 2,4-DB Embutox 625 Estoprop Plus Estoprop XT Express SG ¹ Express Pro FirstStep Fortress ¹ Frontline Hawkeye Heat ⁴ Hoe-Grass II Infinity Leader Linuron 480 + MCPA Logic M Lontrel Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Nuance ¹	Optica Trio Pardner Prestige XC Pulsar Refine M Refine SG Retain Rival 10G Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C Triton K ¹ Trophy ¹ Tundra Turboprop Unity
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Accurate Adrenalin SC (C) Ally Altitude FX (C) Approve Assert FL Attain XC Badge Banvel II + 2,4-D Banvel II + MCPA Barricade Basagran ² + 2,4-D Benchmark ³ Buctril M Clovitox Plus Curtail M Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp	2,4-D Estoprop Plus Estoprop XT Everest ⁴ Everest GBX Express SG Express Pro FirstStep Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Heat ⁴ Hoe-Grass II Horizon BTM Infinity Leader Logic M Mextrol Nimble Pace Prepare Complete Optica Trio Prestige XC Refine M	Refine SG Retain Sencor Signal D Signal M Simplicity ⁴ Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C ⁵ Triton K Trophy ² Tropotox Plus Tundra Turboprop Unity Velocity m3	Achieve Liquid Gold Accurate ¹ Adrenalin SC (C) Ally ¹ Altitude FX (C) Approve Assert ¹ Assert FL Attain XC Avert ¹ Badge Banvel II Barricade Benchmark Broadband Bromotril Brotex 240 Buctril M Caliber 400 Cobutox 600 Crossfire ^{1,2} Curtail M Cypress Deploy Dichlorprop D/DX DyVel DyVel DSp 2,4-D ¹ 2,4-DB	Embutox 625 Estoprop Plus Estoprop XT Everest GBX Express SG ¹ Express Pro FirstStep Fortress ¹ Frontline Frontline 2,4-D Harmony K ² Harmony Max Harmony SG Hawkeye Heat ⁴ Hoe-Grass II Infinity Koril Leader Linuron 480 + MCPA Logic M Lontrel Lorox + MCPA MCPA ¹ (all forms) Mextrol Nimble Nuance ¹ Optica Trio	Pace Pardner Prepare Complete Prestige XC Pulsar Refine M Refine SG Retain Signal D Signal M Simplicity ¹ Spectrum Spike-Up Stellar Sword Target Thrasher Thumper Titanium Tracker XP Triton C Triton K ¹ Trophy ^{1,2} Tundra Turboprop Unity Velocity m3
Oats	Badge Banvel II + 2,4-D Banvel II + MCPA Buctril M Clovitox Plus Curtail M	Deploy DyVel Frontline Heat ⁴ Logic M Mextrol Nimble Refine M	Refine SG Spectrum Sword Target Tracker XP Tropotox Plus	Badge Banvel II Bromotril Brotex 240 Buctril M Caliber 400 Cobutox 600 Curtail M Deploy DyVel DyVel DSp 2,4-DB	Embutox 625 Frontline Hawkeye Heat ⁴ Koril Linuron 480 + MCPA Logic M Lontrel Lorox + MCPA MCPA ¹ (all forms)	Mextrol Nimble Optica trio Pardner Refine M Refine SG Spectrum Sword Target Tracker XP
Fall Rye (spring application)	Achieve Liquid Gold Badge	Buctril M Clovitox Plus 2,4-D	Logic M Mextrol Tropotox Plus	Achieve Liquid Gold Badge Bromotril	Brotex 240 Buctril M 2,4-D ¹ Koril	Logic M MCPA ¹ (all forms) Mextrol Pardner
Triticale	Hoe-Grass II	Infinity		Bromotril Brotex 240	Hoe-Grass II Infinity	Koril Pardner

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information

⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label ⁸ To be used pre-seed or pre-emergence, as a burnoff.

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart – Cereals

Crop	Wild Oats ⁴		Wild Radish
Barley	Achieve Liquid Gold Advance 10G Assert Assert FL Avadex BW Avenge Avert Axial Bonanza Bison Broadband Cordon Express SG Express Pro	FirstStep Fortress Hoe-Grass II Liquid Achieve SC Marengo Puma ¹²⁰ Super Puma Advance Rival 10G Spike-Up Titanium Treflan EC1 Tundra WildCat	Attain XC Banvel II + 2,4-D Banvel II + MCPA Clovitox Plus ¹ Cobutox 600 DyVel 2,4-D Express SG Express Pro MCPA (all forms) Nuance Stellar Topside Trophy Tropotox Plus
Wheat (C - CLEARFIELD wheat)	Achieve Liquid Gold Adrenalin SC (C) Altitude FX (C) Assert Assert FL Aurora Avadex BW Avenge ¹ Avert Axial Bengal Bison Broadband Cordon Cypress Everest Everest GBX Express SG Express Pro FirstStep Foothills Fortress Harmony K ²	Harmony Max Harmony SG Hoe-Grass II Horizon NG Ladder Liquid Achieve SC Marengo Nextstep Pace Prepare Complete Puma ¹²⁰ Super Puma Advance Signal Signal D Signal M Spike-Up Titanium Traxos Tundra Velocity m3 WildCat Vigil	Adrenalin SC (C) Altitude FX (C) Attain XC Banvel II + 2,4-D Banvel II + MCPA Basagran ² + 2,4-D Clovitox Plus ¹ Cobutox 600 DyVel 2,4-D Everest GBX Express SG Express Pro Frontline 2,4-D MCPA (all forms) Nuance Stellar Topside Trophy ² Tropotox Plus
Oats			Banvel II + 2,4-D Banvel II + MCPA Clovitox Plus ¹ Cobutox 600 DyVel MCPA (all forms) Topside Tropotox Plus
Fall Rye (spring application)	Achieve Liquid Gold Avenge ⁷	Bison Liquid Achieve SC Marengo	Clovitox Plus ¹ 2,4-D MCPA (all forms) Topside Tropotox Plus
Triticale	Hoe-Grass II	Bison Liquid Achieve SC Marengo	

¹ Suppression only ² All spring wheat except durum ³ All spring wheats (including durum when tank mixed with 2,4-D ester) ⁴ See page 41 for resistance information

⁵ Top growth control ⁶ Spring rosettes only ⁷ Registered on a limited number of varieties, refer to label

Herbicide Selector Chart – Oilseeds

Crop	Annual Smartweed/ Lady's Thumb	Annual Sow-thistle	Barnyard Grass		Bluebur	Canada Thistle
Canola	Edge ¹ Muster Muster Gold II		Arrow 240 EC Assure II Bonanza Centurion Edge Fusion	Muster Gold II Poast Ultra Rival Select Treflan Yuma		Lontrel
CLEARFIELD Canola	Absolute Odyssey Tensile		Absolute Odyssey Odyssey DLX	Solo Tensile		Absolute Tensile
Liberty Link Canola	Liberty	Liberty	Liberty			Liberty
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC	Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Badge Basagran Basagran Forte Bromotril Brotex Buctril M FlaxMax DLX Hoe-Grass II Koril Logic M MCPA (all forms) Mextrol Pardner	Curtail M MCPA (all forms) FlaxMax DLX	Arrow 240 EC Assure II Bonanza Centurion Eptam	Fusion Hoe-Grass II Poast Ultra Rival Select Treflan Yuma	Badge Bromotril Brotex Buctril M Koril Logic M MCPA (all forms) Mextrol Pardner	Badge ¹ Basagran ¹ Basagran Forte ¹ Buctril M ¹ Curtail M ¹ FlaxMax DLX Logic M ¹ Lontrel MCPA ¹ (all forms) Mextrol ¹
Mustard	Edge ¹ (yellow only) Muster (brown and oriental only)		Arrow 240 EC Bonanza Centurion Edge (yellow only)	Fusion Poast Ultra Rival Select Treflan		
Sunflowers	Edge ¹		Arrow 240 EC Bonanza Centurion Edge Eptam	Poast Ultra Rival Select Solo (C) Treflan		

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Cleavers	Common Chickweed	Common Groundsel	Corn Spurry	Cow Cockle	Dandelion
Canola	Edge ¹	Bonanza Edge Rival Treflan	Lontrel	Edge	Bonanza Edge Rival Treflan	
CLEARFIELD Canola	Absolute Odyssey Odyssey DLX Solo ¹ Tensile ¹	Absolute Odyssey Odyssey DLX			Solo Tensile	
Liberty Link Canola	Liberty	Liberty			Liberty	Liberty
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Basagran Basagran Forte	Basagran Basagran Forte Bonanza Eptam MCPA amine MCPA Na-salt Rival Treflan	Badge Basagran Basagran Forte Bromotril Brotex Buctril M Curtail M FlaxMax DLX Hoe-Grass II Koril Logic M Lontrel MCPA amine Mextrol Pardner	Basagran Basagran Forte Eptam	Badge Bonanza Bromotril Brotex Buctril M Hoe-Grass II Koril Logic M Mextrol Pardner Rival Treflan	Curtail M FlaxMax DLX ¹ MCPA ¹ (all forms)
Mustard	Edge ¹ (yellow only)	Bonanza Edge (yellow only) Rival Treflan		Edge (yellow only)	Bonanza Edge (yellow only) Rival Treflan	
Sunflowers	Edge ¹ Solo (C) ¹	Bonanza Edge Eptam Rival Treflan		Edge Eptam	Bonanza Edge Rival Solo (C) Treflan	

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Field Bindweed	Field Horsetail	Flixweed	Green Foxtail ⁴		Hemp-nettle
Canola			Muster ² Muster Gold II ²	Arrow 240 EC Assure II Bonanza Centurion Edge Equinox Fortress	Fusion Muster Gold II Poast Ultra Rival Select Treflan Yuma	Edge ¹ Muster Muster Gold II
CLEARFIELD Canola			Absolute Odyssey Odyssey DLX	Absolute Equinox Odyssey	Odyssey DLX Solo Tensile	Absolute Odyssey Odyssey DLX ¹
Liberty Link Canola			Liberty	Liberty Equinox		Liberty
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC	Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Basagran ¹ Basagran Forte ¹ MCPA ¹ (all forms)	MCPA ester MCPA K-salt ¹	Badge Buctril M Curtail M FlaxMax DLX Logic M MCPA (all forms) Mextrol	Arrow 240 EC Assure II Bonanza Centurion Eptam Equinox FlaxMax DLX	Fortress Fusion Hoe-Grass II Poast Ultra Rival Select Treflan Yuma	MCPA (all forms)
Mustard			Muster ² (brown and oriental only)	Arrow 240 EC Bonanza Centurion Edge (yellow only) Equinox Fortress	Fusion Rival Poast Ultra Select Treflan	Edge ¹ (yellow only) Muster (brown and oriental only)
Sunflowers				Arrow 240 EC Bonanza Centurion Edge Eptam	Poast Ultra Rival Select Solo (C) Treflan	Edge ¹

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Knotweed	Kochia	Lady's Thumb/ Annual Smartweed	Lamb's-quarters	Narrow-leaved Hawk's-beard
Canola	Bonanza Rival Treflan	Edge Fortress ¹	Edge ¹	Bonanza Edge Fortress ¹ Rival Treflan	
CLEARFIELD Canola		Absolute ¹ Odyssey ¹ Odyssey DLX ¹ Solo ¹ Tensile ¹	Absolute Odyssey ¹ Odyssey DLX Tensile	Absolute ¹ Odyssey ¹ Odyssey DLX ¹ Solo Tensile	
Liberty Link Canola			Liberty	Liberty	
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Bonanza MCPA amine Rival Treflan	Authority Badge Bromotril Brotex Buctril M Curtail M ¹ Fortress ¹ Hoe-Grass II Koril Logic M MCPA amine MCPA ester MCPA K-salt MCPA Na-salt Mextrol Pardner	Badge Basagran Basagran Forte Bromotril Brotex Buctril M FlaxMax DLX Hoe-Grass II Koril Logic M Mextrol Pardner	Authority Badge Basagran Basagran Forte Bromotril Bonanza Bromotril Brotex Buctril M Curtail M Eptam Fortress ¹ FlaxMax DLX Hoe-Grass II Koril Logic M MCPA (all forms) Mextrol Pardner Rival Treflan	
Mustard	Bonanza Rival Treflan	Edge (yellow only) Fortress ¹	Edge ¹ (yellow only)	Bonanza Edge (yellow only) Fortress ¹ Rival Treflan	
Sunflowers	Bonanza Rival Treflan	Authority Edge Solo (C) ¹	Edge ¹	Authority Bonanza Edge Eptam Rival Solo (C) Treflan	

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Night-flowering Catchfly	Perennial Sow-thistle	Persian Dandel	Prostrate Pigweed	Quack Grass
Canola		Lontrel ¹	Arrow 240 EC Bonanza Centurion Fusion Poast Ultra Rival Select Treflan	Edge	Arrow 240 EC Assure II Centurion Equinox Muster Gold II ¹ Poast Ultra Select Yuma
CLEARFIELD Canola		Absolute	Absolute Odyssey Odyssey DLX Tensile		Equinox
Liberty Link Canola		Liberty	Liberty		Liberty ¹
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Badge Buctril M Hoe-Grass II Logic M Mextrol	Badge ¹ Buctril M ¹ Curtail M FlaxMax DLX Logic M ¹ Lontrel ¹ MCPA ¹ (all forms) Mextrol ¹	Arrow 240 EC Bonanza Centurion Fusion Hoe-Grass II Poast Ultra Rival Select Treflan	Eptam MCPA K-salt	Arrow 240 EC Assure II Centurion Eptam Equinox Poast Ultra Select Yuma
Mustard			Arrow 240 EC Bonanza Centurion Fusion Poast Ultra Rival Select Treflan	Edge (yellow only)	Arrow 240 EC Centurion Equinox Select Poast Ultra
Sunflowers			Arrow 240 EC Bonanza Centurion Poast Ultra Rival Select Treflan	Edge Eptam	Arrow 240 EC Centurion Eptam Poast Ultra Select

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Redroot Pigweed	Russian Thistle ⁴	Scentless Chamomile	Shepherd's-purse	Stinkweed
Canola	Edge Fortress ¹ Muster	Bonanza Edge ¹ Fortress ¹ Rival	Lontrel		Muster Muster Gold II
CLEARFIELD Canola	Absolute Odyssey Odyssey DLX Solo Tensile	Absolute Odyssey Odyssey DLX Tensile		Absolute Odyssey Solo Tensile	Absolute Odyssey Odyssey DLX Solo Tensile
Liberty Link Canola	Liberty	Liberty	Liberty	Liberty	Liberty
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Authority Badge Basagran ¹ Basagran Forte ¹ Buctril M Curtail M Eptam FlaxMax DLX Hoe-Grass II Logic M MCPA (all forms) Mextrol	Badge Basagran Basagran Forte ¹ Bonanza Bromotril Brotex Buctril M Fortress ¹ Hoe-Grass II Koril Logic M MCPA Na-salt Mextrol Pardner Rival	Badge ² Buctril M ³ Curtail M FlaxMax DLX Hoe-Grass II Logic M Lontrel Mextrol ⁵	Badge Basagran Basagran Forte Buctril M Curtail M FlaxMax DLX Logic M MCPA (all forms) Mextrol	Badge Basagran Basagran Forte Bromotril Brotex Buctril M Curtail M FlaxMax DLX Hoe-Grass II Koril Logic M MCPA (all forms) Mextrol Pardner
Mustard	Edge (yellow only) Fortress ¹ Muster ¹ (brown and oriental only)	Bonanza Edge ¹ (yellow only) Fortress ¹ Rival			Muster ¹ (brown and oriental only)
Sunflowers	Authority Edge Eptam Solo (C)	Bonanza Edge ¹ Rival		Solo (C)	Assert Solo (C)

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Oilseeds

Crop	Stork's-bill	Tartary Buckwheat	Volunteer Barley	Wild Mustards	Volunteer Oats ¹
Canola			Arrow 240 EC Assure II Centurion Edge ¹ Equinox Fusion Muster Gold II Poast Ultra Select Yuma	Muster Muster Gold II	Arrow 240 EC Assure II Centurion Equinox Muster Gold II Poast Ultra Select Yuma
CLEARFIELD Canola	Absolute Odyssey Odyssey DLX		Absolute Equinox Odyssey Odyssey DLX Solo Tensile	Absolute Odyssey Odyssey DLX Solo Tensile	Absolute Equinox Odyssey Odyssey DLX Solo Tensile
Liberty Link Canola	Liberty		Liberty Equinox	Liberty	Equinox
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II		Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Basagran Basagran Forte	Badge Bromotril Brotex Buctril M Curtail M FlaxMax DLX Hoe-Grass II Koril Logic M MCPA ¹ (all forms) Mextrol Pardner	Arrow 240 EC Assure Centurion Eptam Equinox FlaxMax DLX Fusion Poast Ultra Select Yuma	Badge Basagran Basagran Forte Buctril M Curtail M FlaxMax DLX Hoe-Grass II Logic M MCPA (all forms) Mextrol	Arrow 240 EC Assure II Centurion Eptam Hoe-Grass II Poast Ultra Select Yuma
Mustard			Arrow 240 EC Centurion Edge ¹ (yellow only) Equinox Fusion Poast Ultra Select	Muster (brown and oriental only)	Arrow 240 EC Centurion Poast Ultra Select
Sunflowers			Arrow 240 EC Centurion Edge ¹ Eptam Poast Ultra Select Solo (C)	Assert Solo (C)	Arrow 240 EC Centurion Eptam Poast Ultra Select Solo (C)

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart - Oilseeds

Crop	Volunteer Wheat	Wild Buckwheat	Wild Oats ⁴	Wild Tomato	Witchgrass
Canola	Arrow 240 EC Assure II Centurion Edge Equinox Fusion Muster Gold II Poast Ultra Select Yuma	Bonanza Edge Fortress ¹ Lontrel Rival Treflan	Arrow 240 EC Assure II Avadex BW Bonanza Centurion Edge ¹ Equinox Fortress	Fusion Muster Gold II Poast Ultra Rival Select Treflan Yuma	Arrow 240 EC Assure II Centurion Edge Poast Ultra Select Yuma
CLEARFIELD Canola	Absolute Equinox Odyssey Odyssey DLX Solo ⁵ Tensile	Absolute Odyssey Odyssey DLX Solo ¹ Tensile ¹	Absolute Equinox Odyssey Odyssey DLX	Solo Tensile	
Liberty Link Canola	Liberty Equinox	Liberty	Liberty Equinox		
Roundup Ready Canola	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC	Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II	Credit Eclipse Factor 540 Glyphos Maverick III Roundup Transorb HC Roundup Ultra2 Roundup Weather Max R/T 540 Sharpshooter Plus Touchdown Total Vantage Plus Max II
Flax	Arrow 240 EC Assure Centurion Eptam Equinox FlaxMax DLX Fusion Poast Ultra Select Yuma	Authority Badge Bonanza Bromotril Brotax Buctril M Curtail M Fortress ¹ FlaxMax DLX Hoe-Grass II Koril Logic M Lontrel MCPA Amine ¹ Mextrol Pardner Rival Treflan	Arrow 240 EC Assure II Avadex BW Bonanza Centurion Eptam Equinox Yuma	FlaxMax DLX Fortress Fusion Hoe-Grass II Poast Ultra Rival Select Treflan	Arrow 240 EC Assure II Centurion Eptam Poast Ultra Select Yuma
Mustard	Arrow 240 EC Centurion Edge ¹ (yellow only) Equinox Fusion Poast Ultra Select	Bonanza Edge (yellow only) Fortress ¹ Rival Treflan	Arrow 240 EC Avadex BW Bonanza Centurion Edge ¹ (yellow only) Fortress	Fusion Poast Ultra Rival Select Treflan	Arrow 240 EC Centurion Edge Poast Ultra Select
Sunflowers	Arrow 240 EC Centurion Edge ¹ Eptam Post Ultra Select Solo (C) ¹	Authority Bonanza Edge Rival Solo (C) ¹ Treflan	Arrow 240 EC Bonanza Centurion Edge ¹ Eptam	Post Ultra Rival Select Solo (C) Treflan	Arrow 240 EC Centurion Edge Eptam Post Ultra Select

¹ Suppression only

² Pre-crop emergence to weed seedlings

³ Used as a crop desiccant

⁴ See page 41 for resistance information

⁵ Spring seedlings

(C) CLEARFIELD sunflowers only

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Annual Smartweed	Barnyard Grass		Bluebur	Canada Thistle	
Alfalfa	Seedling	Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹ Koril ⁵ Odyssey ⁵ Pardner ⁵ Pursuit	Arrow 240 EC Bonanza ² Centurion Edge ^{5,2} Eptam ² Hoe-Grass 284	Liquid Achieve SC ⁷ Odyssey ⁵ Poast Ultra Rival ² Select Treflan ²	Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Pardner ⁵	Amitrol 240 ⁶ Basagran ^{1,5} Caliber 400 ¹ Clovitox Plus ^{1,5} Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ^{1,5} Tropotox Plus ^{1,5}
	Established	Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Odyssey ⁵ Pardner ⁵ Princep Reglone ³ Sencor ⁴	Assure II ⁵ Odyssey ⁵ Poast Ultra	Princep Reglone ³ Yuma ⁵	Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Pardner ⁵ Reglone ³	Amitrol 240 ⁶ Basagran ^{1,5}	Glyphosate ⁶ Reglone ³
Alsike Clover	Seedling	Basagran ⁵ Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹	Bonanza ² Hoe-Grass 284 ⁵ Liquid Achieve SC ⁷	Poast Ultra Treflan ²		Amitrol 240 ⁶ Basagran ^{1,5} Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ¹ Tropotox Plus ¹
	Established		Poast Ultra			Amitrol 240 ⁶	Glyphosate ⁶
Cicer Milkvetch	Seedling		Bonanza ² Eptam ^{5,2}	Poast Ultra Treflan ²		Glyphosate ⁶	
	Established		Poast Ultra			Glyphosate ⁶	
Red Clover	Seedling	Basagran ⁵	Bonanza ² Hoe-Grass 284	Liquid Achieve SC ⁷ Treflan ²	MCPA amine	Amitrol 240 ⁶ Basagran ^{1,5} Clovitox Plus ¹	Glyphosate ⁶ Topside ¹ Tropotox Plus ¹
	Established	Reglone ³	Reglone ³		Reglone ³ MCPA amine	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ³
Sweet Clover	Seedling		Bonanza ² Eptam ^{2,5} Hoe-Grass 284 Liquid Achieve SC ⁷	Poast Ultra Rival ² Treflan ²		Amitrol 240 ⁶	Glyphosate ⁶
	Established	Basagran ⁵	Poast Ultra			Amitrol 240 ⁶ Basagran ^{1,5}	Glyphosate ⁶
White Clover	Seedling	Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ Embutox 625 ¹ Topside ¹ Tropotox Plus ¹	Liquid Achieve SC ⁷			Amitrol 240 ⁶ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ¹ Tropotox Plus ¹
	Established	Reglone ³	Reglone ³		Reglone ³	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ^{1,3}
Bird's-foot Trefoil	Seedling	Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹	Bonanza ² Eptam ² Liquid Achieve SC ⁷	Treflan ²		Caliber 400 ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶
	Established	Princep Reglone ³	Princep Reglone ³		Reglone ³	Reglone ³	Glyphosate ⁶
Sainfoin	Seedling	Basagran ⁵	Bonanza ² Hoe-Grass 284 ⁵ Liquid Achieve SC ⁷	Poast Ultra Rival ² Treflan ²		Basagran ^{1,5}	Glyphosate ⁶
	Established		Poast Ultra			Glyphosate ⁶	

¹ Suppression or season long control

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Chickweed	Clovers	Common Groundsel	Corn Spurry	Dandelion
Alfalfa	Seedling	Basagran ⁵ Bonanza ² Edge ^{4,3} Eptam ² Odyssey ⁶ Rival ² Treflan ²		Basagran ⁵ Bromotri ⁶ Brotex 240 ¹ Koril ² Pardner ⁴ Pursuit ¹	Basagran ⁵ Edge ^{2,3} Eptam ²	Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹ Glyphosate ⁶
	Established	Basagran ⁵ Kerb Odyssey ⁶ Reglone ³ Sencor ⁴	Princep Reglone ³	Basagran ⁵ Bromotri ⁶ Brotex 240 ¹ Pardner ⁴ Reglone ³ Sencor ⁴	Basagran ⁵ Reglone ³ Sencor ⁴	Glyphosate ⁶ Reglone ³ Velpar ⁴
Alsike Clover	Seedling	Basagran ⁵ Bonanza ² Treflan ²		Basagran ⁵	Basagran ⁵	Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹ Glyphosate ⁶
	Established					Glyphosate ⁶
Cicer Milkvech	Seedling	Bonanza ² Eptam ^{2,3} Treflan ²			Eptam ^{2,3}	Glyphosate ⁶
	Established					Glyphosate ⁶
Red Clover	Seedling	Basagran ⁵ Bonanza ² Treflan ²		Basagran ⁵	Basagran ⁵	Glyphosate ⁶
	Established	Reglone ³	Reglone ³	Reglone ³	Reglone ³	Glyphosate ⁶ Reglone ³
Sweet Clover	Seedling	Bonanza ² Eptam ^{2,3} Rival ² Treflan ²			Eptam ^{1,2,3}	Glyphosate ⁶
	Established	Basagran ⁵		Basagran ⁵	Basagran ⁵	Glyphosate ⁶
White Clover	Seedling					Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹ Glyphosate ⁶
	Established	Reglone ³	Reglone ³	Reglone ³	Reglone ³	Glyphosate ⁶ Reglone ^{1,2}
Bird's-foot Trefoil	Seedling	Bonanza ² Eptam ² Treflan ²			Eptam ²	Caliber 400 ¹ Cobutox 600 ¹ Embutox 625 ¹ Glyphosate ⁶
	Established	Kerb Reglone ³	Princep Reglone ³	Reglone ³	Reglone ³	Glyphosate ⁶ Reglone ³
Sainfoin	Seedling	Basagran ⁵ Bonanza ² Rival ² Treflan ²		Basagran ⁵	Basagran ⁵	Glyphosate ⁶
	Established					Glyphosate ⁶

¹ Suppression only

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Field Bindweed		Flixweed (seedlings)	Foxtail Barley	Green Foxtail	
Alfalfa	Seedling	Basagran ^{1,5} Caliber 400 ¹ Clovitox Plus ^{1,5} Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ^{1,5} Tropotox Plus ^{1,5}	Odyssey ²	Poast Ultra ¹	Bonanza ² Centurion Edge ^{2,5} Eptam ² Hoe-Grass 284 Liquid Achieve SC ⁷	Odyssey ⁵ Poast Ultra Pursuit ¹ Rival ² Select Treflan ²
	Established	Basagran ^{1,5} Glyphosate ⁶	Reglone ³	Odyssey ⁶ Reglone ¹ Sencor ⁴	Kerb Poast Ultra ¹ Reglone ³	Assure II ⁵ Poast Ultra Odyssey ⁵	Pursuit ^{1,5} Reglone ³ Yuma ²
Alsike Clover	Seedling	Basagran ^{1,5} Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ¹ Tropotox Plus ¹			Bonanza ² Hoe-Grass 284 ⁵ Liquid Achieve SC ⁷	Poast Ultra Treflan ²
	Established	Glyphosate ⁶			Poast Ultra ¹	Poast Ultra	
Cicer Milk Vetch	Seedling	Glyphosate ⁶				Bonanza ² Eptam ^{2,5}	Poast Ultra Treflan ²
	Established	Glyphosate ⁶			Poast Ultra ¹	Poast Ultra	
Red Clover	Seedling	Basagran ^{1,5} Clovitox Plus ¹ Glyphosate ⁶	Topside ¹ Tropotox Plus ¹	MCPA amine		Bonanza ² Hoe-Grass 284 Liquid Achieve SC ⁷	Treflan ²
	Established	Glyphosate ⁶ Reglone ³		MCPA amine Reglone ³	Reglone ³	Reglone ³	
Sweet Clover	Seedling	Glyphosate ⁶				Bonanza ² Eptam ^{1,2,5} Hoe-Grass 284 Liquid Achieve SC ⁷	Poast Ultra Rival ² Treflan ²
	Established	Basagran ⁵ Glyphosate ⁶			Poast Ultra ¹	Poast Ultra	
White Clover	Seedling	Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹ Embutox 625 ¹	Glyphosate ⁶ Topside ¹ Tropotox Plus ¹			Liquid Achieve SC ⁷	
	Established	Glyphosate ⁶	Reglone ³	Reglone ³	Reglone ³	Reglone ³	
Bird's-foot Trefoil	Seedling	Caliber 400 ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶			Bonanza ² Eptam ² Liquid Achieve SC ⁷	Treflan ²
	Established	Glyphosate ⁶	Reglone ³	Reglone ³	Kerb Reglone ³	Reglone ³	
Sainfoin	Seedling	Basagran ^{1,5}	Glyphosate ⁶		Poast Ultra ¹	Bonanza ² Hoe-Grass 284 ⁵ Liquid Achieve SC ⁷	Poast Ultra Rival ² Treflan ²
	Established		Glyphosate ⁶		Poast Ultra ¹	Poast Ultra	

¹ Suppression only

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Kochia	Lamb's-quarters	Leafy Spurge	Mustards
Alfalfa	Seedling	Bromotril ⁵ Brotex 240 ⁵ Edge ^{2,5} Koril ⁵ Odyssey ¹ Pardner ⁵	Basagran ⁵ Bonanza ² Bromotril ⁵ Brotex 240 ⁵ Caliber 400 Clovitox Plus ⁵ Cobutox 600 Edge ^{2,5} Embutox 625	Eptam ² Koril ⁵ Odyssey ^{1,5} Pardner ⁵ Pursuit ¹ Rival ² Topside ⁵ Treflan ² Tropotox Plus ⁵	Amitrol 240 ⁶ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Caliber 400 Clovitox Plus ⁵ Cobutox 600 Embutox 625
	Established	Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Odyssey ^{1,5} Pardner ⁵ Reglone ³	Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Odyssey ^{1,5}	Pardner ⁵ Princep Reglone ³ Sencor ⁴	Amitrol 240 ⁶ Reglone ³ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Koril ⁵ Odyssey ⁵ Pardner ⁵ Reglone ³ Sencor ⁴
Alsike Clover	Seedling		Basagran ⁵ Bonanza ² Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Treflan ² Tropotox Plus	Amitrol 240 ⁶ Basagran ⁵ Caliber 400 Clovitox Plus Cobutox 600
	Established				Amitrol 240 ⁶
Cicer Milk Vetch	Seedling		Bonanza ² Eptam ^{1,2,5}	Treflan ²	
	Established				
Red Clover	Seedling	MCPA amine	Basagran ⁵ Bonanza ² Clovitox Plus MCPA amine	Topside Treflan ² Tropotox Plus	Amitrol 240 ⁶ Basagran ⁵ Clovitox Plus MCPA amine
	Established	MCPA amine Reglone ³	MCPA amine	Reglone ³	Amitrol 240 ⁶ Reglone ³ MCPA amine Reglone ³
Sweet Clover	Seedling		Bonanza ² Eptam ^{1,2,5}	Rival ² Treflan ²	Amitrol 240 ⁶
	Established		Basagran ⁵		Amitrol 240 ⁶ Basagran ⁵
White Clover	Seedling		Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus	Amitrol 240 ⁶ Caliber 400 Clovitox Plus Cobutox 600
	Established	Reglone ³	Reglone ³		Amitrol 240 ⁶ Reglone ³ Reglone ³
Bird's-foot Trefoil	Seedling		Bonanza ² Caliber 400 Cobutox 600	Embutox 625 Eptam ² Treflan ²	Amitrol 240 ⁶ Caliber 400 Cobutox 600
	Established	Reglone ³	Princep	Reglone ³	Amitrol 240 ⁶ Reglone ³ Reglone ³
Sainfoin	Seedling		Basagran ⁵ Bonanza ²	Rival ² Treflan ²	Amitrol 240 ⁶ Basagran ⁵
	Established				Amitrol 240 ⁶

¹ Suppression only

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

For more detailed selector chart information, visit www.agriculture.alberta.ca/herbicide

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Narrow-leaved Hawk's-beard	Night-flowering Catchfly	Perennial Sow-thistle		Quack Grass	
Alfalfa	Seedling	Caliber 400 Cobutox 600 Embutox 625	Bromotri ⁵ Brotex 240 ⁵ Koril ⁵ Pardner ⁵	Amitrol 240 ⁶ Caliber 400 ¹ Clovitox Plus ^{1,5} Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ^{1,5} Tropotox Plus ^{1,5}	Amitrol 240 ⁶ Arrow 240 EC Centurion Eptam ^{1,2}	Glyphosate ⁶ Poast Ultra ¹ Select
	Established	Reglone ³ Velpar ⁵	Bromotri ⁵ Brotex 240 ⁵ Koril ⁵ Pardner ⁵ Reglone ³ Sencor ⁴	Amitrol 240 ⁶ Clovitox Plus ¹ Glyphosate ⁶	Reglone ³ Tropotox Plus ¹ Topside ¹ Velpar ⁵	Amitrol 240 ⁶ Assure II ⁵ Glyphosate ⁶ Kerb	Poast Ultra ¹ Reglone ³ Velpar ⁵ Yuma ⁵
Alsike Clover	Seedling	Caliber 400 Cobutox 600 Embutox 625		Amitrol 240 ⁶ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ¹ Tropotox Plus ¹	Amitrol 240 ⁶ Glyphosate ⁶	Poast Ultra ¹
	Established			Amitrol 240 ⁶	Glyphosate ⁶	Amitrol 240 ⁶ Glyphosate ⁶	Poast Ultra ¹
Cicer Milk Vetch	Seedling			Glyphosate ⁶		Glyphosate ⁶	Poast Ultra ¹
	Established			Glyphosate ⁶		Glyphosate ⁶	Poast Ultra ¹
Red Clover	Seedling			Amitrol 240 ⁶ Clovitox Plus ¹ Glyphosate ⁶	Topside ¹ Tropotox Plus ¹	Amitrol 240 ⁶ Glyphosate ⁶	
	Established	Reglone ³	Reglone ³	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ³	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ³
Sweet Clover	Seedling			Amitrol 240 ⁶	Glyphosate ⁶	Amitrol 240 ⁶ Eptam ^{1,2}	Glyphosate ⁶ Poast Ultra ¹
	Established			Amitrol 240 ⁶	Glyphosate ⁶	Amitrol 240 ⁶ Glyphosate ⁶	Poast Ultra ¹
White Clover	Seedling	Caliber 400 Cobutox 600 Embutox 625		Amitrol 240 ⁶ Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶ Topside ¹ Tropotox Plus ¹	Amitrol 240 ⁶	Glyphosate ⁶
	Established	Reglone ³	Reglone ³	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ³	Amitrol 240 ⁶ Glyphosate ⁶	Reglone ³
Bird's-foot Trefoil	Seedling	Caliber 400 Cobutox 600 Embutox 625		Caliber 400 ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶	Eptam ^{1,2} Glyphosate ⁶	
	Established	Reglone ³	Reglone ³	Glyphosate ⁶	Reglone ³	Kerb Glyphosate ⁶	Reglone ³
Sainfoin	Seedling			Glyphosate ⁶		Glyphosate ⁶	Poast Ultra ¹
	Established			Glyphosate ⁶		Glyphosate ⁶	Poast Ultra ¹

¹ Suppression or season long control

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Redroot Pigweed		Scentless Chamomile (seedlings)	Shepherd's-purse (seedlings)		Stinkweed (seedlings)	
Alfalfa	Seedling	Basagran ^{1,5} Bonanza ² Bromotril ⁶ Brotex 240 ⁵ Caliber 400 Clovitox Plus ⁵ Cobutox 600 Edge ^{2,5} Embutox 625	Eptam ² Koril ⁶ Odyssey ⁶ Pardner ⁵ Pursuit Rival ⁷ Topside ⁵ Treflan ² Tropotox Plus ⁵		Basagran ⁵ Caliber 400 Clovitox Plus ⁵ Cobutox 600 Embutox 625	Odyssey ⁵ Pursuit ¹ Topside ⁵ Tropotox Plus ⁵	Basagran ⁵ Bromotril ⁶ Brotex 240 ⁵ Caliber 400 Clovitox Plus ⁵ Cobutox 600 Embutox 625	Koril ⁶ Odyssey ⁵ Pardner ⁵ Pursuit Topside ⁵ Tropotox Plus ⁵
	Established	Basagran ^{1,5} Bromotril ⁶ Brotex 240 ⁵ Koril ⁶ Odyssey ⁶ Pardner ⁵	Pursuit ¹ Reglone ³ Sencor ⁴	Reglone ³	Basagran ⁵ Odyssey ²	Reglone ³ Sencor ⁴	Basagran ⁵ Bromotril ⁶ Brotex 240 ⁵ Koril ⁶ Odyssey ⁶	Pardner ⁵ Pursuit ⁵ Reglone ³ Sencor ⁴
Alsike Clover	Seedling	Basagran ^{1,5} Bonanza ² Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Treflan ² Tropotox Plus		Basagran ⁵ Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus	Basagran ⁵ Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus
	Established							
Cicer Milk Vetch	Seedling	Bonanza ² Eptam ^{2,5}	Treflan ²					
	Established							
Red Clover	Seedling	Basagran ^{1,5} Bonanza ² Clovitox Plus MCPA amine	Topside Treflan ² Tropotox Plus		Basagran ⁵ Clovitox Plus MCPA amine	Topside Tropotox Plus	Basagran ⁵ Clovitox Plus MCPA amine	Topside Tropotox Plus
	Established	MCPA amine Reglone ³		Reglone ³	MCPA amine Reglone ³		MCPA amine Reglone ³	
Sweet Clover	Seedling	Bonanza ² Eptam ^{2,5}	Rival ⁷ Treflan ²					
	Established	Basagran ^{1,5}			Basagran ⁵		Basagran ⁵	
White Clover	Seedling	Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus		Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus	Caliber 400 Clovitox Plus Cobutox 600	Embutox 625 Topside Tropotox Plus
	Established	Reglone ³		Reglone ³	Reglone ³		Reglone ³	
Bird's-foot Trefoil	Seedling	Bonanza ² Caliber 400 Cobutox 600	Embutox 625 Eptam ² Treflan ²		Caliber 400 Cobutox 600	Embutox 625	Caliber 400 Cobutox 600	Embutox 625
	Established	Reglone ³		Reglone ³	Reglone ³		Reglone ³	
Sainfoin	Seedling	Basagran ^{1,5} Bonanza ²	Rival ⁷ Treflan ²		Basagran ⁵		Basagran ⁵	
	Established							

¹ Suppression only

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Legumes

Crop	Crop Stage	Tall Buttercup	Toadflax	Wild Buckwheat		Wild Oats	
Alfalfa	Seedling	Basagran Clovitox Plus ^{1,5} Topside ^{1,5} Tropotox Plus ^{1,5}	Amitrol 240 ⁶ Glyphosate ⁶	Bonanza ² Bromotri ⁶ Brotex 240 ⁶ Caliber 400 Cobutox 600 Edge ^{2,5}	Embutox 625 Kori ⁶ Odyssey ⁵ Pardner ⁶ Rival ² Treflan ²	Arrow 240 EC Avadex BW ^{2,7} Avenge ⁷ Bonanza ² Centurion Edge ^{1,2,5} Eptam ² Hoe-Grass 284	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Odyssey ⁵ Poast Ultra Rival ² Select Treflan ²
	Established	Basagran	Amitrol 240 ⁶ Glyphosate ⁶ Reglone ³	Bromotri ⁶ Brotex 240 ⁶ Kori ⁶ Odyssey ⁵	Pardner ⁶ Princep Reglone ³	Assure II ⁵ Kerb Odyssey ⁵ Poast Ultra	Princep Reglone ³ Yuma ⁵
Alsike Clover	Seedling	Clovitox Plus ^{1,5} Topside ^{1,5} Tropotox Plus ^{1,5}	Amitrol 240 ⁶ Glyphosate ⁶	Bonanza ² Caliber 400 Cobutox 600	Embutox 625 Treflan ²	Assure II ⁵ Bonanza ² Avadex BW ^{2,7} Hoe-Grass 284 ⁵	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Poast Ultra Treflan ² Yuma ⁵
	Established		Amitrol 240 ⁶ Glyphosate ⁶			Poast Ultra	
Cicer Milk Vetch	Seedling		Glyphosate ⁶	Bonanza ²	Treflan ²	Eptam ^{2,5} Bonanza ²	Poast Ultra Treflan ²
	Established		Glyphosate ⁶			Poast Ultra	
Red Clover	Seedling	Clovitox Plus ^{1,5} MCPA amine Topside ^{1,5} Tropotox Plus ^{1,5}	Amitrol 240 ⁶ Glyphosate ⁶	Bonanza ²	Treflan ²	Assure II ⁵ Avadex BW ^{2,7} Avenge ⁷ Bonanza ² Hoe-Grass 284	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Treflan ² Yuma ⁵
	Established	MCPA amine	Amitrol 240 ⁶ Glyphosate ⁶ Reglone ³	Reglone ³		Reglone ³	
Sweet Clover	Seedling		Amitrol 240 ⁶ Glyphosate ⁶	Bonanza ² Rival ²	Treflan ²	Assure II ⁵ Avadex BW ^{2,7} Avenge ⁷ Bonanza ² Eptam ^{2,5} Hoe-Grass 284	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Poast Ultra Rival ² Treflan ²
	Established		Amitrol 240 ⁶ Glyphosate ⁶			Poast Ultra	
White Clover	Seedling	Clovitox Plus ^{1,5} Topside ^{1,5} Tropotox Plus ^{1,5}	Amitrol 240 ⁶ Glyphosate ⁶	Caliber 400 Cobutox 600	Embutox 625	Assure II ⁵ Avadex BW ⁷	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Yuma ⁵
	Established		Amitrol 240 ⁶ Glyphosate ⁶ Reglone ³	Reglone ³		Reglone ³	
Bird's-foot Trefoil	Seedling		Glyphosate ⁶	Bonanza ² Caliber 400 Cobutox 600	Embutox 625 Treflan ²	Assure II ⁵ Avadex BW ^{2,7} Avenge ⁷ Bonanza ² Eptam ²	Liquid Achieve SC ⁷ MicroActiv ^{2,7} Treflan ² Yuma ⁵
	Established		Reglone ³ Glyphosate ⁶	Princep Reglone ³		Kerb Princep	Reglone ³
Sainfoin	Seedling		Glyphosate ⁶	Bonanza ² Rival ²	Treflan ²	Assure II ⁵ Bonanza ² Hoe-Grass 284 ⁵ Liquid Achieve SC ⁷	Poast Ultra Rival ² Treflan ² Yuma ⁵
	Established		Glyphosate ⁶			Poast Ultra	

¹ Suppression only

² Pre-crop emergence herbicide

³ Used as a crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Forage production only

⁷ Underseeding only

Check individual herbicides for grazing or feed restrictions

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Annual Smartweed					Barnyard Grass
Meadow Brome grass	Seedling	Attain XC ¹ Deploy	MCPA ¹ Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵		
	Established	Attain XC ¹ Deploy	MCPA ¹ Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁴	
Smooth Brome grass	Seedling	Badge ⁵ Banvel II Basagran ³ Bromotri ⁶	Brotex 240 ⁵ Buctril M ³ Deploy 2,4-D	Hoe-Grass II ⁵ Kori ⁶ Logic M ³ MCPA ¹	Mextrol ⁶ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁴	Hoe-Grass II ⁵
	Established	Deploy 2,4-D	MCPA ¹ Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁴	
Crested Wheatgrass	Seedling	Attain XC ³ Badge ⁵ Banvel II Basagran ³	Bromotri ⁶ Brotex 240 ⁵ Buctril M ³ Deploy	2,4-D Hoe-Grass II ⁵ Kori ⁶ Logic M ³	MCPA ¹ Mextrol ⁶ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁴	Hoe-Grass II ⁵
	Established	Accurate Ally Attain XC ³	Deploy 2,4-D MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁴	
Intermediate Wheatgrass	Seedling	Attain XC ³ Badge ⁵ Banvel II Bromotri ⁶	Brotex 240 ⁵ Buctril M ³ Deploy 2,4-D	Hoe-Grass II ⁵ Kori ⁶ Logic M ³ MCPA ¹	Pardner ⁵ Prestige XC ⁵ Mextrol ⁶ Nimble	Refine SG Spectrum ⁵ Sword ⁸ Target ⁴	Hoe-Grass II ⁵
	Established	Accurate Ally Attain XC ³	Deploy 2,4-D MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁴	
Creeping Red Fescue	Seedling	Badge ⁵ Banvel II Basagran ³ Bromotri ⁶	Brotex 240 ⁵ Buctril M ³ Deploy 2,4-D	Hoe-Grass II ⁵ Kori ⁶ Logic M ³ MCPA ¹	Mextrol ⁶ Nimble Pardner ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁴	Hoe-Grass II ⁵ Poast Ultra ⁵
	Established	Accurate Ally Attain XC ³	Banvel II Deploy 2,4-D	MCPA ¹ Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁴	Assure II ⁵ Poast Ultra ⁵
Tall Fescue	Seedling	Attain XC ³ Badge ⁵ Banvel II	Buctril M ³ Deploy 2,4-D	Logic M ³ MCPA ¹	Mextrol ⁶ Nimble	Refine SG Spectrum ⁵	
	Established	Attain XC ³ Deploy	2,4-D MCPA ¹	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁴	
Orchard Grass	Seedling	Badge ⁵ Banvel II Basagran ³ Bromotri ⁶	Brotex 240 ⁵ Buctril M ³ Deploy 2,4-D	Kori ⁶ Logic M ³ MCPA ¹	Mextrol ⁶ Nimble Pardner ⁵	Refine SG Sword ⁸ Target ⁴	
	Established	Accurate Ally	Deploy 2,4-D	MCPA ¹ Nimble	Refine SG Sword ⁸	Target ⁴	
Timothy	Seedling	Attain XC ³ Badge ⁵ Banvel II Basagran ³	Bromotri ⁶ Brotex 240 ⁵ Buctril M ³ Curtail M	2,4-D Logic M ³ MCPA ¹	Mextrol ⁶ Pardner ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁸ Target ⁴	
	Established	Attain XC ³ Badge Buctril M	Curtail M 2,4-D Logic M	MCPA ¹ Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁴	
Hay and Grazing	With Legumes	Caliber 400 ¹	Cobutox 600 ¹	Embutox 625 ¹			
	No Legumes	Banvel II + Mixes Caliber 400 ¹	Cobutox 600 ¹ 2,4-D	Embutox 625 ¹	MCPA ¹	Remedy	

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Bluebur	Burdock		
Meadow Bromegrass	Seedling	Attain XC ¹	MCPA		Attain XC ¹
	Established	Attain XC ¹			Attain XC ¹
Smooth Bromegrass	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes MCPA
	Established	Attain XC ¹ 2,4-D	MCPA		Attain XC ¹ MCPA
Crested Wheatgrass	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes MCPA
	Established	Accurate Ally Attain XC ¹	2,4-D	MCPA	Attain XC ¹ MCPA
Intermediate Wheatgrass	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes MCPA
	Established	Accurate Ally	Attain XC ¹ 2,4-D	MCPA	Attain XC ¹ MCPA
Creeping Red Fescue	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes MCPA
	Established	Accurate Ally	2,4-D	MCPA	Attain XC ¹ Banvel II + Mixes MCPA
Tall Fescue	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes
	Established	Accurate Ally	Attain XC ¹ 2,4-D	MCPA	Attain XC ¹
Orchard Grass	Seedling	Bromotril ³ Brotex 240 ⁵ Buctril M ⁴	2,4-D Koril ⁶ Logic M ⁵	MCPA Pardner ⁸	Banvel II + Mixes
	Established	Attain XC ¹	2,4-D	MCPA	
Timothy	Seedling	Attain XC ¹ Badge ² Bromotril ³ Brotex 240 ⁵	Buctril M ⁴ 2,4-D Koril ⁶ Logic M ⁵	MCPA Mextrol ⁷ Pardner ⁸	Attain XC ¹ Banvel II + Mixes MCPA
	Established	Attain XC ¹ Badge Buctril M	2,4-D Logic M	MCPA Mextrol	Attain XC ¹ MCPA
Hay and Grazing	With Legumes				
	No Legumes	2,4-D	MCPA		Grazon MCPA Remedy

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Canada Thistle				
Meadow Bromegrass	Seedling	Attain XC ^{1,5} Deploy ¹	Glyphosate ⁶ Nimble ¹	Prestige XC ⁵ Refine SG ¹	Refine SG ¹ Spectrum ⁵	Spectrum ⁵
	Established	Attain XC ^{1,5} Deploy ¹	Glyphosate ⁶ Nimble ¹	Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8}	Target ⁸
Smooth Bromegrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Basagran ^{1,5}	Buctril M ^{1,5} Deploy ¹ 2,4-D ¹ Glyphosate ⁶	Logic M ^{1,5} Lontrel MCPA ¹ Mextrol ^{1,5}	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ^{1,5} Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Lontrel MCPA ¹	Nimble ¹ Prestige XC ⁵	Refine SG ¹ Spectrum ⁵	Sword ^{1,8} Target ^{1,8}
Crested Wheatgrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Basagran ^{1,5}	Buctril M ^{1,5} Deploy ¹ 2,4-D ¹ Glyphosate ⁶	Logic M ^{1,5} Lontrel MCPA ¹ Mextrol ^{1,5}	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	Deploy ¹ 2,4-D ¹ Glyphosate ⁶	Lontrel MCPA ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ^{1,8} Target ^{1,8}
Intermediate Wheatgrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Buctril M ^{1,5}	Deploy ¹ 2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel MCPA ¹ Mextrol ^{1,5}	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	Deploy ¹ 2,4-D ¹ Glyphosate ⁶	Lontrel MCPA ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ^{1,8} Target ^{1,8}
Creeping Red Fescue	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Basagran ^{1,5}	Buctril M ^{1,5} Deploy ¹ 2,4-D ¹ Glyphosate ⁶	Logic M ^{1,5} Lontrel MCPA ¹ Mextrol ^{1,5}	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	Banvel II ¹ Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Lontrel MCPA ¹	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
Tall Fescue	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II	Buctril M ^{1,5} Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Logic M ^{1,5} Lontrel	Mextrol ^{1,5} Nimble ¹	Refine SG ¹ Spectrum ⁵
	Established	Attain XC ^{1,5} Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Lontrel	Nimble ¹ Prestige XC ⁵	Refine SG ¹ Spectrum ⁵	Sword ^{1,8} Target ^{1,8}
Orchard Grass	Seedling	Badge ^{1,5} Banvel II ¹ Basagran ^{1,5}	Buctril M ^{1,5} Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Logic M ^{1,5} Lontrel	Mextrol ^{1,5} Nimble ¹ Refine SG ¹	Sword ^{1,8} Target ^{1,8}
	Established	Accurate ¹ Ally ¹	Deploy ¹ 2,4-D ¹	Glyphosate ⁶ Lontrel	Nimble ¹ Refine SG ¹	Sword ^{1,8} Target ^{1,8}
Timothy	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Basagran ^{1,5}	Buctril M ^{1,5} Curtail M 2,4-D ¹ Glyphosate ⁶	Infinity ^{4,5} Logic M ^{1,5} Lontrel	MCPA ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ⁵ Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ^{1,5} Badge ^{1,5} Buctril M ¹	Curtail M 2,4-D ¹ Glyphosate ⁶	Logic M ¹ Lontrel MCPA ¹	Mextrol ¹ Prestige XC ⁵ Spectrum ⁵	Sword ^{1,8} Target ^{1,8}
Hay and Grazing	With Legumes	Amitrol 240 ⁶ Caliber 400 ¹	Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹	Topside ¹	Tropotox Plus ¹
	No Legumes	Amitrol 240 ⁶ Banvel II + Mixes ¹ Caliber 400 ¹	Clovitox Plus ¹ Cobutox 600 ¹ 2,4-D ¹	Escort ¹ Embutox 625 ¹ Grazon	Lontrel MCPA ¹ Topside ¹	Tropotox Plus ¹ Tordon 22K

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Cleavers			Clovers	Common Chickweed	
Meadow Bromegrass	Seedling	Attain XC ⁵ Deploy ¹	Nimble ¹ Prestige XC ⁵	Refine SG ¹ Spectrum ⁵	Lontrel	Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Smooth Bromegrass	Seedling	Attain XC ⁵ Banvel II Basagran ⁵ Deploy ¹	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Basagran ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Crested Wheatgrass	Seedling	Attain XC ⁵ Banvel II Basagran ⁵ Deploy ¹	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Basagran ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Target ⁴	Lontrel	Attain XC ⁵ Ally Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Banvel II Deploy ¹	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ⁸ Target ⁴	Lontrel	Ally Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Creeping Red Fescue	Seedling	Attain XC ⁵ Banvel II ⁵ Basagran ⁵	Deploy ¹ Nimble ¹ Prestige XC ⁵ Refine SG ¹	Spectrum ⁵ Sword ⁸ Target ⁴	Banvel II Lontrel	Attain XC ⁵ Basagran ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ⁸ Target ⁴	Banvel II Lontrel	Ally Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Tall Fescue	Seedling	Attain XC ⁵ Banvel II + Mixes	Deploy ¹ Nimble ¹	Refine SG ¹ Spectrum ⁵	Lontrel	Attain XC ⁵ Deploy Nimble	Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy ¹ Nimble ¹	Prestige XC ⁵ Refine SG ¹ Spectrum ⁵	Sword ⁸ Target ⁴	Lontrel	Attain XC ⁵ Deploy Nimble	Prestige XC ^{1,5} Refine SG Spectrum ⁵
Orchard Grass	Seedling	Banvel II Basagran ⁵ Deploy ¹	Nimble ¹ Refine SG ¹	Sword ⁸ Target ⁴	Lontrel	Basagran ⁵ Deploy	Nimble Refine SG
	Established	Deploy ¹ Nimble ¹	Refine Extra ¹ Sword ⁸	Target ⁴	Lontrel	Ally Deploy	Nimble Refine SG
Timothy	Seedling	Attain XC ⁵ Banvel II Basagran ⁵	Infinity ⁵ Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁴	Lontrel (Alsike only)	Attain XC ⁵ Basagran ⁵ Infinity ⁵	Prestige XC ^{1,5} Spectrum ⁵
	Established	Attain XC ⁵ Prestige XC ⁵	Sword ⁸ Spectrum ⁵	Target ⁴	Lontrel (Alsike only)	Attain XC ⁵ Prestige XC ^{1,5}	Spectrum ⁵
Hay and Grazing	With Legumes					Kerb	
	No Legumes	Banvel II + Mixes			Banvel II + Mixes Grazon	Kerb	

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Common Groundsel			Common Ragweed		
Meadow Brome grass	Seedling	Deploy Nimble	Prestige XC ³ Refine SG		Attain XC ³ MCPA		
	Established	Deploy Nimble	Prestige XC ³ Refine SG		Attain XC ³ MCPA	Sword ⁸	Target ⁶
Smooth Brome grass	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵	Deploy Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ³ Refine SG	Attain XC ³ Badge ⁵ Buctril M ⁵	Logic M ⁵ MCPA Mextrol ⁵	Sword ⁸ Target ⁶
	Established	Deploy Lontrel	Nimble Prestige XC ³	Refine SG	Attain XC ³ MCPA	Sword ⁸	Target ⁶
Crested Wheatgrass	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵	Deploy Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ³ Refine SG	Attain XC ³ Badge ⁵ Banvel II + Mixes ¹	Buctril M ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally Deploy	Lontrel Nimble	Prestige XC ³ Refine SG	Attain XC ³ MCPA	Sword ⁸	Target ⁶
Intermediate Wheatgrass	Seedling	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Deploy	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ Lontrel Mextrol ⁵	Nimble Pardner ⁵ Prestige XC ³ Refine SG	Attain XC ³ Badge ⁵ Buctril M ⁵	Logic M ⁵ Mextrol ⁵	Sword ⁸ Target ⁶
	Established	Accurate Ally Deploy	Lontrel Nimble	Prestige XC ³ Refine SG	Attain XC ³ MCPA	Sword ⁸	Target ⁶
Creeping Red Fescue	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵	Deploy Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ³ Refine SG	Attain XC ³ Badge ⁵ Buctril M ⁵	Logic M ⁵ MCPA Mextrol ⁵	Sword ⁸ Target ⁶
	Established	Accurate Ally Basagran ⁵	Deploy Lontrel Nimble	Prestige XC ³ Refine SG	Attain XC ³ MCPA	Sword ⁸	Target ⁶
Tall Fescue	Seedling	Badge ⁵ Buctril M ⁵ Deploy	Logic M ⁵ Lontrel Mextrol ⁵	Nimble Refine SG	Attain XC ³ Badge ⁵	Banvel II + Mixes Buctril M ⁵	Logic M ⁵ MCPA Mextrol ⁵
	Established	Deploy Lontrel	Nimble Prestige XC ³	Refine SG	Attain XC ³ MCPA	Sword ⁸	Target ⁶
Orchard Grass	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Buctril M ⁵ Brotex 240 ⁵	Deploy Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Nimble Pardner ⁵ Refine SG	Badge ⁵ Buctril M ⁵ Logic M ⁵	MCPA Mextrol ⁵	Sword ⁸ Target ⁶
	Established	Accurate Ally Basagran ⁵	Deploy Lontrel	Nimble Refine SG	MCPA	Sword ⁸	Target ⁶
Timothy	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Buctril M ⁵	Brotex 240 ⁵ Curtail M Koril ⁵ Logic M ⁵	Lontrel Mextrol ⁵ Pardner ⁵ Prestige XC ³	Attain XC ³ Badge ⁵ Banvel II Buctril M ⁵	Infinity ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Sword ⁸ Target ⁶
	Established	Badge Basagran ⁵ Buctril M	Curtail M Logic M ⁵ Lontrel	Mextrol Prestige XC ³	Attain XC ³ Badge Buctril M	Infinity ⁵ Logic M ⁵ Mextrol	MCPA Sword ⁸ Target ⁶
Hay and Grazing	With Legumes				Clovitox Plus	Topside	Tropotox Plus
	No Legumes	Lontrel			Clovitox Plus Grazon	MCPA Remedy	Topside Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Under seeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Corn Spurry		Cow Cockle			
Meadow Bromegrass	Seedling	Deploy Nimble	Refine SG	Deploy Nimble	Refine SG		
	Established	Deploy Nimble Refine SG	Sword ⁵ Target ⁶	Deploy Nimble	Refine SG	Sword ⁵ Target ⁶	
Smooth Bromegrass	Seedling	Banvel II Basagran ⁵ Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Badge ⁵ Banvel II Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁵ Target ⁶
	Established	Deploy Nimble Refine SG	Sword ⁵ Target ⁶	Deploy Nimble	Refine SG	Sword ⁵ Target ⁶	
Crested Wheatgrass	Seedling	Banvel II Basagran ⁵ Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Badge ⁵ Banvel II Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁵ Target ⁶
	Established	Accurate Ally Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Accurate Ally	Deploy Nimble	Refine SG Sword ⁵	Target ⁶
Intermediate Wheatgrass	Seedling	Banvel II Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Badge ⁵ Banvel II Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁵ Target ⁶
	Established	Accurate Ally Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Accurate Ally	Deploy Nimble	Refine SG Sword ⁵	Target ⁶
Creeping Red Fescue	Seedling	Banvel II ⁵ Basagran ⁵ Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Badge ⁵ Banvel II ⁵ Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁵ Target ⁶
	Established	Accurate Ally Banvel II Deploy	Nimble Refine SG Sword ⁵ Target ⁶	Accurate Ally Banvel II	Deploy Nimble	Refine SG Sword ⁵	Target ⁶
Tall Fescue	Seedling	Banvel II Deploy	Nimble Refine SG	Badge ⁵ Banvel II	Buctril M ⁵ Deploy	Logic M ⁵ Mextrol ⁵	Nimble Refine SG
	Established	Deploy Nimble Refine SG	Sword ⁵ Target ⁶	Deploy Nimble	Refine SG	Sword ⁵ Target ⁶	
Orchard Grass	Seedling	Banvel II Basagran ⁵ Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Badge ⁵ Banvel II Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy Koril ⁵ Logic M ⁵	Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁵ Target ⁶
	Established	Accurate Ally Deploy Nimble	Refine SG Sword ⁵ Target ⁶	Accurate Ally	Deploy Nimble	Refine SG Sword ⁵	Target ⁶
Timothy	Seedling	Banvel II Basagran ⁵	Sword ⁵ Target ⁶	Badge ⁵ Banvel II Bromotri ⁵	Brotex 240 ⁵ Buctril M ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵ Koril ⁵	Sword ⁵ Target ⁶
	Established	Sword ⁵	Target ⁶	Badge Buctril M	Logic M ⁵ Mextrol	Sword ⁵ Target ⁶	
Hay and Grazing	With Legumes						
	No Legumes	Banvel II		Banvel II			

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Dandelion			Field Bindweed		
Meadow Bromegrass	Seedling	Attain XC ⁵ MCPA ¹	Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵	Glyphosate ⁶	
	Established	Attain XC ⁵ MCPA ¹	Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ Glyphosate ⁶	Sword ^{1,8}	Target ^{1,8}
Smooth Bromegrass	Seedling	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ Basagran ^{1,5} 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶	MCPA ¹
Crested Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ Basagran ^{1,5} 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶	MCPA ¹
Intermediate Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶	MCPA ¹
	Established	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
Creeping Red Fescue	Seedling	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ Basagran ^{1,5} 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ⁵ Banvel II + Mixes ¹	2,4-D ¹ MCPA ¹	Prestige XC ⁵ Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Banvel II + Mixes ¹	Glyphosate ⁶ MCPA ¹
Tall Fescue	Seedling	Attain XC ⁵ 2,4-D ¹	MCPA ¹	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶	MCPA ¹
	Established	Attain XC ⁵ 2,4-D ¹	MCPA ¹ Prestige XC ⁵	Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
Orchard Grass	Seedling	2,4-D ¹	MCPA ¹		Basagran ^{1,5} 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
	Established	2,4-D ¹	MCPA ¹		2,4-D ¹ Glyphosate ⁶	MCPA ¹ Sword ^{1,8}	Target ^{1,8}
Timothy	Seedling	Attain XC ⁵ Curtail M	2,4-D ¹ MCPA ¹	Prestige XC ⁵ Spectrum ⁵	Attain XC ⁵ Basagran ^{1,5} 2,4-D ¹	Glyphosate ⁶ MCPA ¹	Sword ^{1,8} Target ^{1,8}
	Established	Attain XC ⁵ Curtail M	2,4-D ¹ MCPA ¹	Prestige XC ⁵ Spectrum ⁵	Attain XC ⁵ 2,4-D ¹	Glyphosate ⁶	MCPA ¹
Hay and Grazing	With Legumes	Amirto 240 ⁶ Caliber 400 ¹	Cobutox 600 ¹	Embutox 625 ¹	Caliber 400 ¹ Clovitox Plus ¹	Cobutox 600 ¹ Embutox 625 ¹	Topside ¹ Tropotox Plus ¹
	No Legumes	Amirto 240 ⁶ Caliber 400 ¹ Cobutox 600 ¹	Embutox 625 ¹ Escort 2,4-D ¹	Grazon MCPA ¹ Remedy	Banvel II Caliber 400 ¹ Clovitox Plus ¹ Cobutox 600 ¹	2,4-D ¹ Embutox 625 ¹ MCPA ¹ Remedy	Topside ¹ Tordon 22K Tropotox Plus ¹

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Flixweed (seedlings)				Green Foxtail
Meadow Brome grass	Seedling	Attain XC ³ Deploy	MCPA Nimble	Prestige XC ³ Refine SG	Spectrum ⁵	
	Established	Attain XC ³ Deploy MCPA	Nimble Prestige XC ³	Refine SG Spectrum ⁵	Sword ⁶ Target ⁴	
Smooth Brome grass	Seedling	Attain XC ³ Badge ² Banvel II + Mixes Buctril M ¹	Deploy 2,4-D Logic M ⁵ MCPA	Mextrol ¹ Nimble Prestige XC ³ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁴	Hoe-Grass II ⁵
	Established	Attain XC ³ Deploy 2,4-D	MCPA Nimble Prestige XC ³	Refine SG Spectrum ⁵	Sword ⁶ Target ⁴	Liquid Achieve SC ¹
Crested Wheatgrass	Seedling	Attain XC ³ Badge ² Banvel II + Mixes Buctril M ¹	Deploy 2,4-D Logic M ⁵ MCPA	Mextrol ¹ Nimble Prestige XC ³ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁴	Hoe-Grass II ⁵
	Established	Ally Attain XC ³ Deploy	2,4-D MCPA Nimble	Prestige XC ³ Refine SG Spectrum ⁵	Sword ⁶ Target ⁴	Liquid Achieve SC
Intermediate Wheatgrass	Seedling	Attain XC ³ Badge ² Banvel II + Mixes Buctril M ¹	Deploy 2,4-D Logic M ⁵ MCPA	Mextrol ¹ Nimble Prestige XC ³ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁴	Hoe-Grass II ⁵
	Established	Ally Attain XC ³ Deploy	2,4-D MCPA Nimble	Prestige XC ³ Refine SG Spectrum ⁵	Sword ⁶ Target ⁴	
Creeping Red Fescue	Seedling	Attain XC ³ Badge ² Banvel II + Mixes Buctril M ¹	Deploy 2,4-D Logic M ⁵ MCPA	Mextrol ¹ Nimble Prestige XC ³ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁴	Hoe-Grass II ⁵ Poast Ultra ¹
	Established	Ally Attain XC ³ Banvel II + Mixes	Deploy 2,4-D MCPA	Nimble Prestige XC ³ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁴	Assure II ⁵ Poast Ultra ¹
Tall Fescue	Seedling	Attain XC ³ Badge ² Banvel II + Mixes	Buctril M ¹ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ¹	Nimble Refine SG Spectrum ⁵	
	Established	Attain XC ³ Deploy 2,4-D	MCPA Nimble Prestige XC ³	Refine SG Spectrum ⁵	Sword ⁶ Target ⁴	
Orchard Grass	Seedling	Badge ² Banvel II + Mixes Buctril M ¹	Deploy 2,4-D Logic M ⁵	MCPA Mextrol ¹ Nimble	Refine SG Sword ⁶ Target ⁴	
	Established	Ally Deploy	2,4-D MCPA	Nimble Refine SG	Sword ⁶ Target ⁴	
Timothy	Seedling	Attain XC ³ Badge ² Banvel II + Mixes Curtail M	Buctril M ¹ 2,4-D Infinity ⁴ Logic M ⁵	MCPA Mextrol ¹ Prestige XC ³	Spectrum ⁵ Sword ⁶ Target ⁴	
	Established	Attain XC ³ Badge Buctril M	Curtail M 2,4-D Logic M ⁵	MCPA Mextrol ¹ Prestige XC ³	Spectrum ⁵ Sword ⁶ Target ⁴	
Hay and Grazing	With Legumes					
	No Legumes	2,4-D	MCPA			

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Hemp-nettle			Kochia			
Meadow Brome	Seedling	Attain XC ^{1,5} Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Deploy ¹	MCPA Nimble ¹	Prestige XC ⁵ Refine SG ¹	Refine SG ¹
	Established	Attain XC ^{1,5} Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Deploy ¹	MCPA Nimble ¹	Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Smooth Brome	Seedling	Attain XC ^{1,5} Banvel II Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotri ⁸ Brotex 240 ⁵	Buctril M ⁵ Deploy ¹ 2,4-D Hoe-Grass II ⁵ Koril ⁸	Logic M ⁵ Mextrol ⁸ Nimble ¹ Pardner ⁵ Prestige XC ⁵	Refine SG ¹ Sword ⁸ Target ⁶ MCPA
	Established	Attain XC ^{1,5} Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Deploy ¹ 2,4-D	MCPA Nimble ¹	Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Crested Wheatgrass	Seedling	Attain XC ^{1,5} Banvel II Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotri ⁸ Brotex 240 ⁵	Buctril M ⁵ Deploy ¹ 2,4-D Hoe-Grass II ⁵ Logic M ⁵	Koril ⁸ MCPA Mextrol ⁸ Nimble ¹ Pardner ⁵	Prestige XC ⁵ Refine SG ¹ Sword ⁸ Target ⁶
	Established	Accurate Ally ¹ Attain XC ^{1,5} Deploy	MCPA ¹ Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Accurate ¹ Ally ¹ Attain XC ⁵	Deploy ¹ 2,4-D MCPA	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Intermediate Wheatgrass	Seedling	Attain XC ^{1,5} Banvel II Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Banvel II Bromotri ⁸ Brotex 240	Buctril M ⁵ Deploy ¹ 2,4-D Hoe-Grass II ⁵ Logic M ⁵	Koril ⁸ MCPA Mextrol ⁸ Nimble ¹ Pardner ⁵	Prestige XC ⁵ Refine SG ¹ Sword ⁸ Target ⁶
	Established	Accurate Ally ¹ Attain XC ^{1,5} Deploy	MCPA ¹ Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Accurate ¹ Ally ¹ Attain XC ⁵	Deploy ¹ 2,4-D MCPA	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Creeping Red Fescue	Seedling	Attain XC ^{1,5} Banvel II Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Banvel II Bromotri ⁸ Brotex 240 ⁵	Buctril M ⁵ Deploy ¹ 2,4-D Hoe-Grass II ⁵ Logic M ⁵	Koril ⁸ MCPA Mextrol ⁸ Nimble ¹ Pardner ⁵	Prestige XC ⁵ Refine SG ¹ Sword ⁸ Target ⁶
	Established	Accurate Ally ¹ Attain XC ^{1,5} Deploy	MCPA ¹ Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Accurate ¹ Ally ¹ Attain XC ⁵ Banvel II	Deploy ¹ 2,4-D MCPA	Nimble ¹ Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Tall Fescue	Seedling	Attain XC ^{1,5} Banvel II Deploy	MCPA ¹ Nimble	Refine SG Spectrum ⁵	Attain XC ⁵ Badge ⁵ Banvel II	Buctril M ⁵ Deploy ¹ 2,4-D	Logic M ⁵ MCPA Mextrol ⁸	Nimble ¹ Refine SG ¹
	Established	Attain XC ^{1,5} Deploy MCPA ¹	Nimble Prestige XC ^{1,5} Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Attain XC ⁵ Deploy ¹ 2,4-D	MCPA Nimble ¹	Prestige XC ⁵ Refine SG ¹	Sword ⁸ Target ⁶
Orchard Grass	Seedling	Banvel II Deploy MCPA ¹	Nimble Refine SG	Sword ⁸ Target ⁶	Badge ⁵ Banvel II Bromotri ⁸ Brotex 240 ⁵	Buctril M ⁵ Deploy ¹ 2,4-D Koril ⁸	Logic M ⁵ MCPA Mextrol ⁸ Nimble ¹	Pardner ⁵ Refine SG ¹ Sword ⁸ Target ⁶
	Established	Ally ¹ Deploy MCPA ¹	Nimble Refine SG	Sword ⁸ Target ⁶	Ally ¹ Deploy ¹	2,4-D MCPA	Nimble ¹ Refine SG ¹	Sword ⁸ Target ⁶
Timothy	Seedling	Attain XC ^{1,5} Banvel II Infinity ⁵	MCPA ¹ Prestige XC ^{1,5} Spectrum ⁵	Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Banvel II Brotex 240 ⁵	Buctril M ⁵ Curtail M ¹ 2,4-D Infinity ⁵	Koril ⁸ Logic M ⁵ Mextrol ⁸	Prestige XC ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ^{1,5} MCPA ¹	Prestige XC ^{1,5} Spectrum ⁵	Sword ⁸ Target ⁶	Attain XC ⁵ Badge ⁵ Buctril M	Curtail M ¹ 2,4-D Logic M ⁵	MCPA Mextrol ⁸ Prestige XC ⁵	Sword ⁸ Target ⁶
Hay and Grazing	With Legumes	Clovitox Plus ¹	Topside ¹	Tropotox Plus ¹				
	No Legumes	Clovitox Plus ¹ MCPA ¹	Topside ¹	Tropotox Plus ¹	2,4-D	Escort	MCPA	

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

⁹ 90% of kochia-surveyed fields have resistance to Group 2 herbicides such as these products. Use herbicides from another herbicide group to control kochia.

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Lamb's-quarters				
Meadow Brome grass	Seedling	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵	Refine SG	Spectrum ⁵
	Established	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁶
Smooth Brome grass	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Logic M ⁵ MCPA Mextrol ⁵	Nimble Pardner ⁵ Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ Deploy	2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Crested Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally ¹ Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ MCPA Mextrol ⁵	Nimble Pardner ⁵ Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally ¹ Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Creeping Red Fescue	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶ Pardner ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Banvel II 2,4-D Deploy	MCPA Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Tall Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA	Mextrol ⁵ Nimble	Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy	2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Orchard Grass	Seedling	Badge ⁵ Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D	Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁸ Target ⁶
	Established	Accurate ¹ Ally ¹	Deploy 2,4-D	MCPA Nimble	Refine SG Sword ⁸	Target ⁶
Timothy	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ Badge Buctril M	2,4-D Curtail M Logic M	MCPA Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁶
Hay and Grazing	With Legumes	Caliber 400 Clovitox Plus	Cobutox 600	Embutox 625	Topside	Tropotox Plus
	No Legumes	Caliber 400 Clovitox Plus	Cobutox 600 2,4-D	Embutox 625 MCPA	Remedy Topside	Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Undersowing only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Leafy Spurge	Mustards				
Meadow Bromegrass	Seedling	Attain XC ⁵ MCPA ¹	Attain XC ⁵	MCPA	Spectrum ⁵		
	Established	Attain XC ⁵ MCPA ¹	Attain XC ⁵	MCPA	Spectrum ⁵	Sword ⁸	Target ⁸
Smooth Bromegrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁸
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ 2,4-D	MCPA	Spectrum ⁵	Sword ⁸	Target ⁸
Crested Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II	Basagran ⁵ Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵	2,4-D Hoe-Grass II Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁸
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally	Attain XC ⁵ 2,4-D	MCPA Spectrum ⁵	Sword ⁸	Target ⁸
Intermediate Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Bromotri ⁵	Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁸
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally	Attain XC ⁵ MCPA	Spectrum ⁵	Sword ⁸	Target ⁸
Creeping Red Fescue	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁸
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally Attain XC ⁵	Banvel II + Mixes	2,4-D MCPA	Spectrum ⁵ Sword ⁸	Target ⁸
Tall Fescue	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵	Banvel II + Mixes	Buctril M ⁵ 2,4-D	Logic M ⁵ MCPA	Spectrum ⁵
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ 2,4-D	MCPA	Spectrum ⁵	Sword ⁸	Target ⁸
Orchard Grass	Seedling	2,4-D ¹ MCPA ¹	Badge ⁵ Banvel II Basagran ⁵	Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵	2,4-D Koril ⁵ Logic M ⁵	Mextrol ⁵ MCPA Pardner ⁵	Sword ⁸ Target ⁸
	Established	2,4-D ¹ MCPA ¹	Accurate Ally	2,4-D	MCPA	Sword ⁸	Target ⁸
Timothy	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁸
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge Buctril M	Curtail M 2,4-D	Logic M MCPA	Mextrol ⁵ Spectrum ⁵	Sword ⁸ Target ⁸
Hay and Grazing	With Legumes	Amitrol 240 ⁶	Caliber 400 Clovitox Plus	Cobutox 600	Embutox 625	Topside	Tropotox Plus
	No Legumes	Amitrol 240 ⁶ 2,4-D ¹ MCPA ¹ Tordon 22K	Banvel II Caliber 400	Clovitox Plus Cobutox 600	Embutox 625 2,4-D	MCPA Topside	Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Narrow-leaved Hawk's-beard		Night-flowering Catchfly			
Meadow Bromegrass	Seedling	Deploy Nimble	Refine SG				
	Established	Deploy Nimble	Refine SG	Sword ⁸	Target ⁸		
Smooth Bromegrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Deploy 2,4-D ¹	Nimble Refine SG	Sword ⁸		Target ⁸	
Crested Wheatgrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Intermediate Wheatgrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Creeping Red Fescue	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Tall Fescue	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵	Buctril M ⁵	Logic M ⁵	Mextrol ⁵
	Established	Deploy 2,4-D ¹	Nimble Refine SG	Sword ⁸	Target ⁸		
Orchard Grass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Timothy	Seedling	2,4-D ¹		Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	2,4-D ¹		Badge Buctril M ⁵	Logic M ⁵ Mextrol	Sword ⁸	Target ⁸
Hay and Grazing	With Legumes	Caliber 400 Cobutox 600	Embutox 625 (all fall applied)				
	No Legumes	Caliber 400 Cobutox 600 2,4-D ¹	Embutox 625 (all fall applied)				

- ¹ Suppression only
² Pre-plant incorporate treatment
³ Used as crop desiccant
⁴ Under irrigation only
⁵ Seed production only
⁶ Spot treatment only
⁷ Underseeding only
⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Leafy Spurge	Mustards				
Meadow Bromegrass	Seedling	Attain XC ⁵ MCPA ¹	Attain XC ⁵	MCPA	Spectrum ⁵		
	Established	Attain XC ⁵ MCPA ¹	Attain XC ⁵	MCPA	Spectrum ⁵	Sword ⁸	Target ⁶
Smooth Bromegrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ 2,4-D	MCPA	Spectrum ⁵	Sword ⁸	Target ⁶
Crested Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II	Basagran ⁵ Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵	2,4-D Hoe-Grass II Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally	Attain XC ⁵ 2,4-D	MCPA Spectrum ⁵	Sword ⁸	Target ⁶
Intermediate Wheatgrass	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally	Attain XC ⁵ MCPA	Spectrum ⁵	Sword ⁸	Target ⁶
Creeping Red Fescue	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Accurate Ally Attain XC ⁵	Banvel II + Mixes	2,4-D MCPA	Spectrum ⁵ Sword ⁸	Target ⁶
Tall Fescue	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵	Banvel II + Mixes	Buctril M ⁵ 2,4-D	Logic M ⁵ MCPA	Spectrum ⁵
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ 2,4-D	MCPA	Spectrum ⁵	Sword ⁸	Target ⁶
Orchard Grass	Seedling	2,4-D ¹ MCPA ¹	Badge ⁵ Banvel II Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵	2,4-D Koril ⁵ Logic M ⁵	Mextrol ⁵ MCPA Pardner ⁵	Sword ⁸ Target ⁶
	Established	2,4-D ¹ MCPA ¹	Accurate Ally	2,4-D	MCPA	Sword ⁸	Target ⁶
Timothy	Seedling	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge ⁵ Banvel II Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ 2,4-D ¹ MCPA ¹	Attain XC ⁵ Badge Buctril M	Curtail M 2,4-D	Logic M MCPA	Mextrol ⁵ Spectrum ⁵	Sword ⁸ Target ⁶
Hay and Grazing	With Legumes	Amitrol 240 ⁶	Caliber 400 Clovitox Plus	Cobutox 600	Embutox 625	Topside	Tropotox Plus
	No Legumes	Amitrol 240 ⁶ 2,4-D ¹ MCPA ¹ Tordon 22K	Banvel II Caliber 400	Clovitox Plus Cobutox 600	Embutox 625 2,4-D	MCPA Topside	Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Narrow-leaved Hawk's-beard		Night-flowering Catchfly			
Meadow Bromegrass	Seedling	Deploy Nimble	Refine SG				
	Established	Deploy Nimble	Refine SG	Sword ⁸	Target ⁸		
Smooth Bromegrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Deploy 2,4-D ¹	Nimble Refine SG	Sword ⁸	Target ⁸		
Crested Wheatgrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Intermediate Wheatgrass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Creeping Red Fescue	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Hoe-Grass II ⁵ Koril ⁵	Logic M ⁵ Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Tall Fescue	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵	Buctril M ⁵	Logic M ⁵	Mextrol ⁵
	Established	Deploy 2,4-D ¹	Nimble Refine SG	Sword ⁸	Target ⁸		
Orchard Grass	Seedling	Deploy 2,4-D ¹	Nimble Refine SG	Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	Accurate Ally Deploy	2,4-D ¹ Nimble Refine SG	Sword ⁸	Target ⁸		
Timothy	Seedling	2,4-D ¹		Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵	Sword ⁸ Target ⁸
	Established	2,4-D ¹		Badge Buctril M ⁵	Logic M ⁵ Mextrol	Sword ⁸	Target ⁸
Hay and Grazing	With Legumes	Caliber 400 Cobutox 600	Embutox 625 (all fall applied)				
	No Legumes	Caliber 400 Cobutox 600 2,4-D ¹	Embutox 625 (all fall applied)				

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Perennial Sow-thistle				Plantain	Prickly Lettuce
Meadow Bromegrass	Seedling	Attain XC ^{1,5}	Glyphosate ⁶	Prestige XC ⁵	Spectrum ^{1,5}		MCPA
	Established	Attain XC ^{1,5} Glyphosate ⁶	Prestige XC ⁵ Spectrum ^{1,5}	Sword ^{1,8}	Target ^{1,8}		MCPA
Smooth Bromegrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Buctril M ^{1,5}	2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Attain XC ^{1,5} 2,4-D ¹ Glyphosate ⁶	Lontrel ¹ MCPA ¹	Prestige XC ⁵ Spectrum ^{1,5}	Sword ^{1,8} Target ^{1,8}		MCPA
Crested Wheatgrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II + Mixes ¹ Buctril M ^{1,5}	2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	2,4-D ¹ Glyphosate ⁶ Lontrel ¹	MCPA ¹ Prestige XC ⁵ Spectrum ^{1,5}	Sword ^{1,8} Target ^{1,8}		MCPA
Intermediate Wheatgrass	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Buctril M ^{1,5}	2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	2,4-D ¹ Glyphosate ⁶ Lontrel ¹	MCPA ¹ Prestige XC ⁵ Spectrum ^{1,5}	Sword ^{1,8} Target ^{1,8}		MCPA
Creeping Red Fescue	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II ¹ Buctril M ^{1,5}	2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Accurate ¹ Ally ¹ Attain XC ^{1,5}	Banvel II ¹ 2,4-D ¹ Glyphosate ⁶	Lontrel ¹ MCPA ¹ Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
Tall Fescue	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II + Mixes	Buctril M ^{1,5} 2,4-D ¹ Glyphosate ⁶	Logic M ^{1,5} Lontrel ¹	Mextrol ^{1,5} Spectrum ^{1,5}		MCPA
	Established	Attain XC ^{1,5} 2,4-D ¹	Glyphosate ⁶ Lontrel ¹	Prestige XC ⁵ Spectrum ^{1,5}	Sword ^{1,8} Target ^{1,8}		MCPA
Orchard Grass	Seedling	Badge ^{1,5} Banvel II ¹ Buctril M ^{1,5}	2,4-D ¹ Glyphosate ⁶ Logic M ^{1,5}	Lontrel ¹ Mextrol ^{1,5}	Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Accurate ¹ Ally ¹	2,4-D ¹ Glyphosate ⁶	Lontrel ¹ Sword ^{1,8}	Target ^{1,8}		MCPA
Timothy	Seedling	Attain XC ^{1,5} Badge ^{1,5} Banvel II + Mixes Buctril M ^{1,5}	Curtail M ¹ 2,4-D ¹ Glyphosate ⁶ Infinity ^{1,5}	Logic M ^{1,5} Lontrel ¹ Mextrol ^{1,5} Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
	Established	Attain XC ^{1,5} Badge ¹ Buctril M ¹ Curtail M	2,4-D ¹ Glyphosate ⁶ Logic M ¹ Lontrel ¹	MCPA ¹ Mextrol ¹ Prestige XC ⁵	Spectrum ^{1,5} Sword ^{1,8} Target ^{1,8}		MCPA
Hay and Grazing	With Legumes	Amitrol 240 ⁶ Caliber 400 ¹	Clovitox Plus ¹ Cobutox 600 ¹	Embutox 625 ¹ Glyphosate ⁶	Topside ¹ Tropotox Plus ¹	Clovitox Plus ¹ Topside ¹ Tropotox Plus ¹	
	No Legumes	Amitrol 240 ⁶ Banvel II + Mixes Caliber 400 ¹ Clovitox Plus ¹	Cobutox 600 ¹ 2,4-D ¹ Escort ¹ Embutox 625 ¹	Glyphosate ⁶ Lontrel ¹ MCPA ¹	Topside ¹ Tropotox Plus ¹ Tordon 22K	Clovitox Plus ¹ Grazon Topside ¹ Tropotox Plus ¹	Grazon MCPA Remedy

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Quack Grass	Redroot Pigweed				
Meadow Bromegrass	Seedling		Attain XC ⁵ Deploy	Nimble	Prestige XC ⁵	Refine SG	Spectrum ⁵
	Established		Attain XC ⁵ Deploy	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁶	Target ⁶
Smooth Bromegrass	Seedling	Glyphosate ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Deploy	2,4-D Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁶ Target ⁶
	Established	Glyphosate ⁶	Attain XC ⁵ Deploy	2,4-D MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁶ Target ⁶
Crested Wheatgrass	Seedling	Glyphosate ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ^{1,5}	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Deploy	2,4-D Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁶ Target ⁶
	Established	Glyphosate ⁶	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁶ Target ⁶
Intermediate Wheatgrass	Seedling	Glyphosate ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ Mextrol ⁵	Nimble Pardner ⁵ Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁶ Target ⁶
	Established	Glyphosate ⁶	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁶ Target ⁶
Creeping Red Fescue	Seedling	Glyphosate ⁶ Poast Ultra ³	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ^{1,5}	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Deploy	2,4-D Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁶ Target ⁶
	Established	Assure II ⁵ Glyphosate ⁶ Poast Ultra ³	Accurate Ally Attain XC ⁵	Banvel II + Mixes Basagran ^{1,5} Deploy	2,4-D MCPA ¹ Nimble	Prestige XC ⁵ Refine SG Spectrum ⁵	Sword ⁶ Target ⁶
Tall Fescue	Seedling	Glyphosate ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy	2,4-D Logic M ⁵	Mextrol ⁵ Nimble	Refine SG Spectrum ⁵
	Established	Glyphosate ⁶	Attain XC ⁵ Deploy	2,4-D Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁶	Target ⁶
Orchard Grass	Seedling	Glyphosate ⁶	Banvel II + Mixes Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy	2,4-D Koril ⁵ Logic M ⁵	Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁶ Target ⁶
	Established	Glyphosate ⁶	Accurate Ally	Deploy 2,4-D	Nimble Refine SG	Sword ⁶	Target ⁶
Timothy	Seedling	Glyphosate ⁶	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Koril ⁵ Logic M ⁵	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁶ Target ⁶
	Established	Glyphosate ⁶	Attain XC ⁵ Badge Basagran ^{1,5}	Buctril M Curtail M 2,4-D	Logic M MCPA ¹ Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁶ Target ⁶
Hay and Grazing	With Legumes	Amitrol 240 ⁵ Glyphosate ⁵ Kerb	Caliber 400 Clovitox Plus	Cobutox 600	Embutox 625	Topside	Tropotox Plus
	No Legumes	Amitrol 240 ⁵ Glyphosate ⁵ Kerb	Banvel II + Mixes Caliber 400	Clovitox Plus Cobutox 600	2,4-D Embutox 625	MCPA Topside	Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Russian Thistle				Scentless Chamomile (seedlings)		
Meadow Brome	Seedling	Attain XC ⁵	Deploy	Nimble	Refine SG	Prestige XC ⁵		
	Established	Attain XC ⁵ Deploy	Nimble Refine SG	Sword ⁶	Target ⁶	Prestige XC ⁵		
Smooth Brome	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵ Bromotri ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Mextrol ⁵ Nimble	Pardner ⁵ Refine SG Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵
	Established	Attain XC ⁵ Deploy	2,4-D Nimble	Refine SG Sword ⁶	Target ⁶	Lontrel	Prestige XC ⁵	
Crested Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵ Bromotri ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Mextrol ⁵ Nimble	Pardner ⁵ Refine SG Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Deploy 2,4-D	Nimble Refine SG	Sword ⁶ Target ⁶	Accurate Ally	Lontrel	Prestige XC ⁵
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Mextrol ⁵ Nimble	Pardner ⁵ Refine SG Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵
	Established	Ally ¹ Attain XC ⁵	Deploy 2,4-D	Nimble Refine SG	Sword ⁶ Target ⁶	Accurate Ally	Lontrel	Prestige XC ⁵
Creeping Red Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵ Bromotri ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Mextrol ⁵ Nimble	Pardner ⁵ Refine SG Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Banvel II + Mixes Deploy 2,4-D	Nimble Refine SG	Sword ⁶ Target ⁶	Accurate Ally	Lontrel	Prestige XC ⁵
Tall Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy	2,4-D Logic M ⁵	Mextrol ⁵ Nimble Refine SG	Badge ⁵ Buctril M ⁵	Logic M ⁵ Lontrel	Mextrol ⁵
	Established	Attain XC ⁵ Deploy	2,4-D Nimble	Refine SG Sword ⁶	Target ⁶	Lontrel	Prestige XC ⁵	
Orchard Grass	Seedling	Banvel II + Mixes Basagran ⁵ Bromotri ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D Koril ⁵	Logic M ⁵ Pardner ⁵ Nimble	Refine SG Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵
	Established	Accurate Ally	Deploy 2,4-D	Nimble Refine SG	Sword ⁶ Target ⁶	Accurate	Ally	Lontrel
Timothy	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotri ⁵ Brotex 240 ⁵ Buctril M ⁵ 2,4-D	Infinity ⁵ Koril ⁵ Logic M ⁵ Mextrol ⁵	Pardner ⁵ Sword ⁶ Target ⁶	Badge ⁵ Bromotri ⁵ Buctril M ⁵ Curtail M	Koril ⁵ Logic M ⁵ Lontrel	Mextrol ⁵ Pardner ⁵ Prestige XC ⁵
	Established	Attain XC ⁵ Badge	Buctril M 2,4-D	Logic M Mextrol	Sword ⁶ Target ⁶	Badge Buctril M Curtail M	Logic M Lontrel	Mextrol Prestige XC ⁵
Hay and Grazing	With Legumes							
	No Legumes	Banvel II + Mixes 2,4-D	Escort	Sword ⁶	Target ⁶	Escort	Lontrel	Tordon 22K

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Shepherd's-purse (seedlings)				
Meadow Brome grass	Seedling	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵	Refine SG	Spectrum ⁵
	Established	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁶
Smooth Brome grass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ⁵	Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ Deploy	2,4-D MCPA ⁵	Nimble Prestige XC	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Crested Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ⁵	Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ⁵	Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Creeping Red Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ⁵	Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Accurate Ally Attain XC ⁵	Banvel II + Mixes Deploy 2,4-D	MCPA Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Tall Fescue	Seedling	Attain XC ⁵ Badge ⁵ Buctril M ⁵	Deploy 2,4-D	Logic M ⁵ MCPA	Mextrol ⁵ Nimble	Refine SG Spectrum ⁵
	Established	Attain XC ⁵ Deploy	2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶
Orchard Grass	Seedling	Badge ⁵ Banvel II + Mixes Basagran ⁵	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA Mextrol ⁵	Nimble Refine SG	Sword ⁸ Target ⁶
	Established	Accurate Ally	Deploy 2,4-D	MCPA Nimble	Refine SG Sword ⁸	Target ⁶
Timothy	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Basagran ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Logic M ⁵	MCPA Mextrol ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁸ Target ⁶
	Established	Attain XC ⁵ Badge Buctril M	Curtail M 2,4-D Logic M	MCPA Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁶
Hay and Grazing	With Legumes	Caliber 400 Clovitox Plus	Cobutox 600	Embutox 625	Topside	Tropotox Plus
	No Legumes	Banvel II + Mixes Caliber 400	Clovitox Plus Cobutox 600	2,4-D Embutox 625	MCPA Topside	Tropotox Plus

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Stinkweed (seedlings)					Tansy	Toadflax
Meadow Bromegrass	Seedling	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵		Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Attain XC ⁵ Deploy	MCPA Nimble	Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸	Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
Smooth Bromegrass	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Attain XC ⁵ Deploy	2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
Crested Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶ Nimble ¹ Refine SG ¹	
	Established	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁹	Accurate ¹ Ally ¹ Deploy ¹	Glyphosate ⁶ Nimble ¹ Refine SG ¹
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ MCPA Mextrol ⁵	Nimble Pardner ⁵ Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Accurate Ally Attain XC ⁵	Deploy 2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁹	Accurate ¹ Ally ¹ Deploy ¹	Glyphosate ⁶ Nimble ¹ Refine SG ¹
Creeping Red Fescue	Seedling	Attain XC ⁵ Badge ⁵ Basagran ⁵ Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Deploy 2,4-D	Hoe-Grass II ⁵ Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Accurate Ally Attain XC ⁵	Banvel II + Mixes Deploy	2,4-D MCPA Nimble	Prestige XC ⁵ Refine SG Spectrum ⁵	Sword ⁸ Target ⁹	Accurate ¹ Ally ¹ Deploy ¹	Glyphosate ⁶ Nimble ¹ Refine SG ¹
Tall Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy 2,4-D	Logic M ⁵ MCPA	Mextrol ⁵ Nimble	Refine SG Spectrum ⁵	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Attain XC ⁵ Deploy	2,4-D MCPA	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
Orchard Grass	Seedling	Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Deploy	2,4-D Koril ⁵ Logic M ⁵ MCPA	Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁸ Target ⁹	Deploy ¹ Glyphosate ⁶	Nimble ¹ Refine SG ¹
	Established	Accurate Ally	Deploy 2,4-D	MCPA Nimble	Refine SG Sword ⁸	Target ⁹	Accurate ¹ Ally ¹ Deploy ¹	Glyphosate ⁶ Nimble ¹ Refine SG ¹
Timothy	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Basagran ⁵	Bromotril ⁵ Brotex 240 ⁵ Buctril M ⁵ Curtail M	2,4-D Infinity ⁵ Koril ⁵ Logic M ⁵	MCPA Mextrol ⁵ Pardner ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁸ Target ⁹	Glyphosate ⁶	
	Established	Attain XC ⁵ Badge Buctril M	Curtail M 2,4-D Logic M	MCPA Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁹	Glyphosate ⁶	
Hay and Grazing	With Legumes	Cobutox 600 Caliber 400	Clovitox Plus	Embutox 625	Topside	Tropotox Plus	Amitrol 240 ⁶	Glyphosate ⁶
	No Legumes	Banvel II + Mixes Cobutox 600	Caliber 400 Clovitox Plus	2,4-D Embutox 625	MCPA Topside	Tropotox Plus	Escort Amitrol 240 ⁶ Glyphosate ⁶	Tordon 22K

NOTE: See footnotes on next page.

Herbicide Selector Chart – Forage Grasses

Crop	Crop Stage	Wild Buckwheat					Wild Oats
Meadow Bromegrass	Seedling	Attain XC ⁵ Deploy	2,4-D ¹ MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Spectrum ⁵ Target ⁶	Avenge ⁷
	Established	Attain XC ⁵ Deploy	2,4-D ¹ MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶	
Smooth Bromegrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D ¹ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁶	Avenge ⁷ Hoe-Grass II ⁵
	Established	Attain XC ⁵ Deploy 2,4-D ¹	Lontrel MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶	
Crested Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D ¹ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁶	Avenge ⁷ Hoe-Grass II ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Deploy 2,4-D ¹ Lontrel	MCPA ¹ Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶	
Intermediate Wheatgrass	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D ¹ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁶	Hoe-Grass II ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Deploy 2,4-D ¹ Lontrel	MCPA ¹ Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶	
Creeping Red Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D ¹ Hoe-Grass II ⁵	Koril ⁵ Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble Pardner ⁵ Prestige XC ⁵	Refine SG Spectrum ⁵ Sword ⁸ Target ⁶	Avenge ⁷ Hoe-Grass II ⁵ Poast Ultra ⁵
	Established	Accurate ¹ Ally ¹ Attain XC ⁵	Banvel II + Mixes Deploy	2,4-D ¹ Lontrel MCPA ¹	Nimble Prestige XC ⁵ Refine SG	Spectrum ⁵ Sword ⁸ Target ⁶	Assure II ⁵ Poast Ultra ⁵
Tall Fescue	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes	Buctril M ⁵ Deploy 2,4-D ¹	Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble	Refine SG Spectrum ⁵	Avenge ⁷
	Established	Attain XC ⁵ Deploy 2,4-D ¹	Lontrel MCPA ¹	Nimble Prestige XC ⁵	Refine SG Spectrum ⁵	Sword ⁸ Target ⁶	
Orchard Grass	Seedling	Badge ⁵ Banvel II + Mixes Bromotril ⁵ Brotex 240 ⁵	Buctril M ⁵ Deploy 2,4-D ¹ Koril ⁵	Logic M ⁵ Lontrel MCPA ¹	Mextrol ⁵ Nimble Pardner ⁵	Refine SG Sword ⁸ Target ⁶	Avenge ⁷
	Established	Accurate ¹ Ally ¹	Deploy 2,4-D ¹	Lontrel MCPA ¹	Nimble Refine SG	Sword ⁸ Target ⁶	
Timothy	Seedling	Attain XC ⁵ Badge ⁵ Banvel II + Mixes Bromotril ⁵	Brotex 240 ⁵ Buctril M ⁵ Curtail M 2,4-D ¹	Infinity ⁵ Koril ⁵ Logic M ⁵ Lontrel	MCPA ¹ Mextrol ⁵ Pardner ⁵ Prestige XC ⁵	Spectrum ⁵ Sword ⁸ Target ⁶	Avenge ⁷
	Established	Attain XC ⁵ Badge Buctril M	Curtail M 2,4-D ¹ Logic M	Lontrel MCPA ¹ Mextrol	Prestige XC ⁵ Spectrum ⁵	Sword ⁸ Target ⁶	
Hay and Grazing	With Legumes	Caliber 400	Cobutox 600	Embutox 625			Kerb
	No Legumes	Banvel II + Mixes Caliber 400	Cobutox 600 2,4-D ¹	Embutox 625	Lontrel	MCPA ¹	Kerb

¹ Suppression only

² Pre-plant incorporate treatment

³ Used as crop desiccant

⁴ Under irrigation only

⁵ Seed production only

⁶ Spot treatment only

⁷ Underseeding only

⁸ Forage production only

Herbicide Selector Chart – Other Crops

Crop	American Nightshade	Annual Smartweed/Lady's Thumb			Annual Sow-thistle	
Beans Check label	Dual II Magnum	Basagran	Basagran Forte			
Canary Seed	Badge Bromotril Brotex 240 Buctril M Koril Logic M Mextrol Pardner	Badge Banvel II Bromotril Brotex 240	Buctril M Koril Logic M Mextrol	Pardner Sword Target Tracker XP	Curtail M Prestige XC Sword	Target Tracker XP
Chickpeas		Sencor				
Field Corn	Badge Bromotril Brotex 240 Buctril M Dual II Magnum Koril Logic M Mextrol Pardner Primextra II Magnum	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Banvel II Basagran Basagran Forte Bromotril	Brotex 240 Buctril M Cobutox 600 ¹ 2,4-D 2,4-DB ¹ DyVel DSp Embutox Koril Laddok	Logic M MCPA Amine ¹ MCPA K-salt MCPA Na-salt Mextrol Pardner Primextra II Magnum Princep Nine-T	Clovitox Plus ¹ 2,4-D DyVel DSp MCPA Amine ¹	MCPA K-salt MCPA Na-salt Topside Tropotox Plus
Liberty Link Corn		Liberty 200 SN				
Roundup Ready Corn	Glyphosate	Glyphosate			Glyphosate	
Sweet Corn	Badge Bromotril Brotex 240 Buctril M Dual II Magnum Koril Logic M Mextrol Pardner	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Basagran	Basagran Forte Bromotril Brotex 240 Buctril M DyVel DSp	Koril Laddok Logic M Mextrol Pardner	DyVel DSp	
Fababeans		Basagran	Basagran Forte			
Lentils		Odyssey ⁴	Odyssey DLX ⁴	Sencor		
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Dual II Magnum	Basagran Basagran Forte MCPA Amine ¹ MCPA Na-salt	Gladiator Multistar Odyssey Odyssey DLX Pursuit	Sencor Solo Viper	Clovitox Plus ¹ MCPA Amine ¹ MCPA Na-salt ¹	Topside Tropotox Plus
Potatoes Irrigated (irr)	Dual II Magnum	Sencor				

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

Herbicide Selector Chart – Other Crops

Crop	Barnyard Grass			Canada Thistle		Cleavers
Beans Check label	Arrow 240 EC Assure II Bonanza	Centurion Dual II Magnum Edge Eptam	Poast Ultra Rival Select Shadow Solo Treflan	Basagran ¹	Basagran Forte ¹	Basagran Basagran Forte Edge ¹ Heat ⁶ Solo ¹
Canary Seed				Badge ¹ Banvel II Buctril M ¹ Curtail M Logic M ¹	Mextrol ¹ Prestige XC Sword ¹ Target ¹ Tracker XP ¹	Banvel II Heat ⁶ Prestige XC Sword Target Tracker XP
Chickpeas	Arrow Assure II Centurion	Poast Ultra Select Shadow Yuma				
Field Corn	Accent Dual II Magnum	Primextra II Magnum	Princep Nine-T	Badge ¹ Banvel II ¹ Basagran ¹ Basagran Forte ¹ Buctril M ¹ Clovitox Plus ¹ Cobutox 600 ¹ DyVel DSp ¹ Embutox	Logic M ¹ MCPA Amine ¹ MCPA Na-salt ¹ Z,4-DB ¹ Mextrol ¹ Topside ¹ Tropotox Plus ¹	Banvel II Basagran Basagran Forte DyVel DSp ¹ Heat ⁶
Liberty Link Corn	Liberty 200 SN			Liberty 200 SN		
Roundup Ready Corn	Glyphosate			Glyphosate		Glyphosate
Sweet Corn	Accent	Dual II Magnum		Badge ¹ Basagran ¹ Basagran Forte ¹ Buctril M ¹	DyVel DSp ¹ Logic M ¹ Mextrol ¹	Basagran Basagran Forte DyVel DSp ¹
Fababeans	Bonanza	Edge Poast Ultra	Rival Treflan	Basagran ¹	Basagran Forte ¹	Basagran Basagran Forte Edge ¹
Lentils	Arrow 240 EC Assure II Bonanza Centurion	Edge Fusion Odyssey ⁴ Odyssey DLX ⁴ Poast Ultra	Rival Select Shadow Solo ⁴ Treflan Yuma			Edge ¹ Heat ⁶ Odyssey ⁴ Odyssey DLX ⁴ Solo ^{1,4}
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Arrow 240 EC Assure II Bonanza Centurion Dual II Magnum	Edge Fusion Odyssey Odyssey DLX Poast Ultra Rival	Rival 10G Select Shadow Solo Treflan Viper Yuma	Basagran ¹ Basagran Forte ¹ Clovitox Plus ¹ MCPA Amine ¹	MCPA Na-salt ¹ Topside ¹ Tropotox Plus ¹	Basagran Basagran Forte Edge ¹ Gladiator Heat ⁶ Multistar Odyssey Odyssey DLX Pursuit Solo ¹ Viper ¹
Potatoes Irrigated (irr)	Arrow 240 EC Centurion Dual II Magnum	Eptam Poast Ultra Prism (irr)	Select Shadow			

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

⁶ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Other Crops

Crop	Cocklebur		Common Chickweed		Common Groundsel		Corn Spurry
Beans Check label	Basagran	Basagran Forte	Basagran Basagran Forte Bonanza	Edge Eptam Rival Treflan	Basagran		Basagran Basagran Forte Edge Eptam
Canary Seed	Badge Banvel II + MCPA Bromotril Brotex 240 Buctril M	Koril Logic M Mextrol Pardner	Prestige XC		Badge Bromotril Brotex 240 Buctril M Curtail M	Koril Logic M Mextrol Pardner	Banvel II Sword Target Tracker XP
Chickpeas			Sencor				Sencor
Field Corn	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M 2,4-D DyVel DSp	Koril Laddok Logic M MCPA amine MCPA K-salt MCPA Na-salt Mextrol Pardner	Basagran Basagran Forte 2,4-D	Laddok	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M	2,4-D Koril Laddok Logic M Mextrol Pardner	Banvel II Basagran Basagran Forte DyVel DSp Laddok
Liberty Link Corn	Liberty 200 SN		Liberty 200 SN				
Roundup Ready Corn	Glyphosate Primextra II Magnum	Princep Nine-T	Glyphosate Primextra II Magnum	Princep Nine-T			Glyphosate
Sweet Corn	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M	DyVel DSp Koril Laddok Logic M Mextrol Pardner	Basagran Basagran Forte	Laddok	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M	Koril Laddok Logic M Mextrol Pardner	Basagran Basagran Forte DyVel DSp Laddok
Fababeans	Basagran	Basagran Forte	Basagran Basagran Forte Bonanza	Edge Rival Treflan	Basagran Basagran Forte		Basagran Basagran Forte Edge
Lentils			Bonanza Edge Odyssey ¹	Odyssey DLX ¹ Rival Sencor Treflan			Edge Sencor
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Basagran Basagran Forte	MCPA amine MCPA Na-salt	Advance 10G Basagran Basagran Forte Bonanza Edge Gladiator Multistar Odyssey	Odyssey DLX Pursuit Rival Sencor Treflan	Basagran Basagran Forte		Basagran Basagran Forte Edge Sencor
Potatoes Irrigated (irr)			Eptam	Sencor			Eptam Sencor

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

Herbicide Selector Chart - Other Crops

Crop	Cow Cockle		Green Foxtail		Hairy Nightshade	Hemp-nettle
Beans Check label	Bonanza Edge	Rival Solo Treflan	Arrow 240 EC Assure II Bonanza Centurion Dual II Magnum	Edge Eptam Equinox Poast Ultra Rival Select Shadow Solo Treflan Yuma	Basagran Basagran Forte Eptam Gladiator Multistar Pursuit	Edge ¹ Eptam
Canary Seed	Badge Banvel II Banvel II + MCPA Bromotril Brotex 240 Buctril M Koril	Logic M Mextrol Pardner Sword Target Tracker XP				Banvel II + MCPA K-salt Prestige XC ¹ Sword Target Tracker XP
Chickpeas			Arrow Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma		Sencor
Field Corn	Badge Banvel II Bromotril Brotex 240 Buctril M	DyVel DSp Koril Logic M Mextrol Pardner	Accent Dual II Magnum	Primextra II Magnum	Basagran Basagran Forte	Clovitox Plus ¹ MCPA Amine ¹ MCPA K-salt ¹ MCPA Na-salt ¹ Topside Tropotox Plus
Liberty Link Corn			Liberty 200 SN			
Roundup Ready Corn	Glyphosate Primextra II Magnum	Princep Nine-T	Glyphosate Primextra II Magnum	Princep Nine-T	Glyphosate	Glyphosate
Sweet Corn	Badge Bromotril Brotex 240 Buctril M DyVel DSp	Koril Logic M Mextrol Pardner	Accent Dual II Magnum		Basagran Basagran Forte	
Fababeans	Bonanza Edge	Rival Treflan	Bonanza Edge	Poast Ultra Rival Treflan	Basagran Basagran Forte	Edge
Lentils	Bonanza Edge	Rival Solo ⁴ Treflan	Arrow 240 EC Assure II Bonanza Centurion Equinox Fusion Odyssey ⁴	Odyssey DLX ⁴ Poast Ultra Rival Select Shadow Solo ⁴ Treflan Yuma		Edge Odyssey ⁴ Odyssey DLX ^{4,1} Sencor
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Bonanza Edge Rival	Solo Treflan Viper	Arrow 240 EC Assure II Bonanza Centurion Edge Equinox Gladiator Multistar Fusion Odyssey	Odyssey DLX Poast Ultra Pursuit Rival Select Shadow Solo Treflan Viper Yuma	Basagran Basagran Forte	Clovitox Plus ¹ Edge ¹ Gladiator MCPA Amine ¹ MCPA Na-salt ¹ Multistar Odyssey ¹ Odyssey DLX ¹ Pursuit Sencor Topside Tropotox Plus
Potatoes Irrigated (irr)			Arrow 240 EC Centurion Dual II Magnum Eptam	Poast Ultra Prism (irr) Select Shadow	Eptam	Sencor

¹ Suppression only

² Pre-emergence to crop, post-emergence to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

Herbicide Selector Chart – Other Crops

Crop	Knotweed	Kochia	Lamb's-quarters			
Beans Check label	Bonanza Rival Treflan	Edge Solo	Basagran Basagran Forte Bonanza	Edge Eptam	Rival Solo Treflan	
Canary Seed	Sword Target Tracker XP	Badge Banvel II + MCPA Bromotril Brotex 240 Buctril M Koril Logic M	Mextrol Pardner Prestige XC Sword Target Tracker XP	Badge Bromotril Brotex 240 Buctril M Curtail M	Koril Logic M Mextrol Pardner	Prestige XC Sword Target Tracker XP
Chickpeas		Authority ² Heat ⁶		Sencor	Authority ² Heat ⁶	
Field Corn	DyVel DSp 2,4-D	Badge Bromotril Brotex 240 Buctril M Heat ⁶ DyVel DSp 2,4-D	Koril Logic M MCPA amine MCPA K-salt Mextrol Pardner	Aatrex Liquid 480 Aatrex Nine-O Atrazine Arazine 480 Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M	Clovitox Plus Clovitox 600 DyVel DSp 2,4-D 2,4-DB Embutox Heat ⁶ Koril Laddok Logic M MCPA amine	MCPA K-salt MCPA Na-salt Mextrol Pardner Primextra II Magnum Princep Nine-T Topside Tropotox Plus
Liberty Link Corn						
Roundup Ready Corn		Glyphosate		Glyphosate		
Sweet Corn	DyVel DSp	Badge Bromotril Brotex 240 Buctril M DyVel DSp	Koril Logic M Mextrol Pardner	Aatrex Liquid 480 Aatrex Nine-O Atrazine Arazine 480 Badge Basagran	Basagran Forte Bromotril Brotex 240 Buctril M DyVel DSp	Koril Laddok Logic M Mextrol Pardner
Fababeans	Bonanza Rival Treflan	Edge		Basagran Basagran Forte	Bonanza Edge	Rival Treflan
Lentils	Bonanza Rival Treflan	Edge Heat ⁶ Odyssey ^{1,4}	Odyssey DLX ^{1,4} Solo ^{1,4}	Bonanza Heat ⁶ Odyssey ^{1,4}	Odyssey DLX ^{1,4} Rival Sencor	Solo ⁴ Treflan
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Bonanza Rival Treflan	Authority ² Edge Heat ⁶ MCPA amine Odyssey ¹	Odyssey DLX ¹ Solo ¹ Viper ¹	Authority ² Basagran Basagran Forte Bonanza Clovitox Plus Edge	Heat ⁶ MCPA amine MCPA Na-salt Odyssey ¹ Odyssey DLX ¹ Rival Sencor	Solo Topside Treflan Tropotox Plus Viper
Potatoes Irrigated (irr)				Eptam	Prism ¹ (irr)	Sencor

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

⁶ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Other Crops

Crop	Mustards			Night-flowering Catchfly	Perennial Sow-thistle
Beans Check label	Basagran	Basagran Forte	Solo		
Canary Seed	Badge Banvel II Bromotril Brotex 240	Buctril M Koril Logic M Mextrol	Pardner Sword Target Tracker XP	Badge Buctril M Logic M Mextrol Sword Target Tracker XP	Badge ¹ Banvel II ¹ Buctril M ¹ Curtail M Logic M Mextrol ¹ Prestige XC Sword ¹ Target ¹ Tracker XP ¹
Chickpeas	Sencor				
Field Corn	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Basagran Basagran Forte Badge Banvel II Bromotril	Brotex 240 Buctril M Clovitox Plus Cobutox 600 DyVel DSp 2,4-DB Embutox Koril Laddok	Logic M MCPA amine MCPA K-salt MCPA Na-salt Mextrol Pardner Primextra II Magnum Topside Tropotox Plus	Badge Buctril M Logic M Mextrol	Badge ¹ Banvel II ¹ Buctril M ¹ Clovitox Plus ¹ Cobutox 600 ¹ 2,4-DB ¹ Embutox Logic M ¹ MCPA Amine ¹ MCPA K-salt ¹ MCPA Na-salt ¹ Mextrol ¹ Princep Nine-T Topside ¹ Tropotox Plus ¹
Liberty Link Corn	Liberty 200 SN				Liberty 200 SN
Roundup Ready Corn	Glyphosate			Glyphosate	Glyphosate
Sweet Corn	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Basagran	Basagran Forte Bromotril Brotex 240 Buctril M DyVel DSp	Koril Laddok Logic M Mextrol II Pardner	Badge Buctril M Logic M Mextrol	Badge ¹ Buctril M ¹ Logic M Mextrol ¹
Fababeans	Basagran	Basagran Forte			
Lentils	Odyssey ⁴	Odyssey DLX ⁴	Sencor ¹		
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Basagran Basagran Forte Clovitox Plus Gladiator MCPA amine MCPA Na-salt	Multistar Odyssey Odyssey DLX Pursuit Sencor	Solo Topside Tropotox Plus Viper		Clovitox Plus ¹ MCPA Amine ¹ MCPA Na-salt ¹ Topside ¹ Tropotox Plus ¹
Potatoes Irrigated (irr)	Sencor				

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

Herbicide Selector Chart - Other Crops

Crop	Persian Darnel		Prostrate Pigweed	Purslane		Quack Grass	
Beans Check label	Arrow 240 EC Bonanza Centurion	Poast Ultra Rival Select Shadow Treflan	Edge Eptam	Advance 10G Bonanza Edge	Eptam Rival Treflan	Arrow 240 EC Assure II Centurion Eptam	Equinox Poast Ultra Select Shadow Yuma
Canary Seed			Sword Target Tracker XP				
Chickpeas	Arrow Centurion	Poast Ultra Select Shadow				Arrow Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma
Field Corn Check label to ensure chosen chemical or mix is registered for use on the crop			DyVel DSP 2,4-D MCPA K-salt Primextra II Magnum	Aatrex Liquid 480 Atrazine Arazine 480 Basagran Basagran Forte 2,4-D Laddok	MCPA amine MCPA K-salt MCPA Na-salt Primextra II Magnum Princep Nine-T	Accent	
Liberty Link Corn						Liberty 200 SN	
Roundup Ready Corn						Glyphosate	
Sweet Corn				Aatrex Nine-O Atrazine Arazine 480	Basagran Basagran Forte Laddok	Accent	
Fababeans	Edge Poast Ultra	Rival Treflan	Edge	Basagran Basagran Forte Bonanza	Edge Rival Treflan	Poast Ultra	
Lentils	Arrow 240 EC Bonanza Centurion Fusion Odyssey ¹ Odyssey DLX ¹	Poast Ultra Rival Select Shadow Solo ⁴ Treflan	Edge	Advance 10G Bonanza Edge	Rival Treflan	Arrow 240 EC Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Arrow 240 EC Bonanza Centurion Fusion Odyssey Odyssey DLX	Poast Ultra Rival Select Shadow Treflan Viper	Edge	Basagran Basagran Forte Bonanza Edge	MCPA amine MCPA Na-salt Rival Treflan	Arrow 240 EC Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma
Potatoes Irrigated (irr)	Arrow 240 EC Centurion Poast Ultra	Select Shadow	Eptam	Eptam		Arrow 240 EC Centurion Eptam Poast Ultra	Prism (irr) Select Shadow

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

Herbicide Selector Chart - Other Crops

Crop	Redroot Pigweed		Russian Thistle		Shepherd's Purse	
Beans	Basagran ¹	Eptam	Basagran ¹	Rival	Basagran Solo	Basagran Forte
Check label	Basagran Forte ¹ Bonanza Dual II Magnum Edge	Rival Solo Treflan	Basagran Forte ¹ Edge ¹			
Canary Seed	Badge Banvel II Banvel II + MCPA Basagran ¹ Buctril M Curtail M Heat ⁶ Laddok	Logic M Mextrol Prestige XC Sword Target Tracker XP	Badge Banvel II + MCPA Bromotril Brotex 240 Buctril M Koril	Logic M Mextrol Pardner Sword Target Tracker XP	Badge Banvel II + MCPA Buctril M Curtail M Logic M	Mextrol Prestige XC Sword Target Tracker XP
Chickpeas	Authority ² Heat ⁶					
Field Corn	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Banvel II Basagran ¹ Basagran Forte ¹ Buctril M Clovitox Plus Cobutox 600 Dual II Magnum ¹ DyVel DSp	2,4-D 2,4-DB Embutox Heat ⁶ Logic M MCPA amine MCPA K-salt MCPA Na-salt Mextrol Primextra II Magnum Topside Tropotox	Badge Basagran ¹ Basagran Forte ¹ Bromotril Brotex 240 Buctril M 2,4-D	DyVel DSp Koril Laddok Logic M Mextrol Pardner	Badge Basagran Basagran Forte Buctril M Clovitox Plus Cobutox 600 DyVel DSp 2,4-D 2,4-D B	Embutox Logic M MCPA amine MCPA K-salts MCPA Na-salt Mextrol Topside Tropotox Plus
Liberty Link Corn	Liberty 200 SN				Liberty 200 SN	
Roundup Ready Corn	Glyphosate		Glyphosate			
Sweet Corn	Aatrex Liquid 480 Aatrex Nine-O Atrazine Atrazine 480 Badge Basagran ¹ Basagran Forte ¹	Buctril M Dual II Magnum ^{1,2} DyVel DSp Laddok Logic M Mextrol	Badge Basagran ¹ Basagran Forte ¹ Bromotril Brotex 240 Buctril M	DyVel DSp Koril Laddok Logic M Mextrol Pardner	Badge Basagran Basagran Forte	Buctril M DyVel DSp Logic M Mextrol
Fababeans	Basagran ¹ Basagran Forte ¹	Edge	Basagran ¹ Basagran Forte ¹	Edge Rival	Basagran Basagran Forte	
Lentils	Edge Heat ⁶ Odyssey ⁴	Odyssey DLX ⁴ Solo ⁴	Bonanza Odyssey ⁴ Odyssey DLX ⁴	Reglone ³ Rival Sencor	Odyssey ⁴ Odyssey DLX ^{4,1}	Solo ⁴
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Authority ² Basagran ¹ Basagran Forte ¹ Clovitox Plus Edge Gladiator Heat ⁶ MCPA amine MCPA Na-salt Multistar Odyssey	Odyssey DLX Pursuit Solo Topside Tropotox Plus Viper	Basagran ¹ Basagran Forte ¹ Edge ¹	Odyssey Odyssey DLX Rival	Basagran Basagran Forte Clovitox Plus Gladiator MCPA amine MCPA Na-salt Multistar Odyssey	Odyssey DLX ¹ Pursuit Solo Topside Tropotox Plus Viper
Potatoes Irrigated (irr)	Dual II Magnum Eptam	Prism (irr) Sencor			Sencor	

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

⁶ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Other Crops

Crop	Stinkweed		Tartary Buckwheat		Volunteer Cereals		Volunteer Oats	
Beans Check label	Basagran Basagran Forte	Solo			Arrow 240 EC Assure II Centurion Edge ¹ Equinox	Eptam Poast Ultra Select Shadow Solo Yuma	Arrow 240 EC Assure II Centurion Eptam Poast Ultra	Select Shadow Solo Yuma
Canary Seed	Badge Bromotril Brotex 240 Buctril M Curtail M Koril Logic M	Mextrol Pardner Prestige XC Sword Target Tracker XP	Badge Banvel II Banvel II + MCPA Bromotril Brotex 240 Buctril M Curtail M Koril	Logic M Mextrol Pardner Prestige XC Sword Target Tracker XP				
Chickpeas	Sencor Heat ²		Sencor		Arrow Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma	Arrow Assure II Centurion Poast Ultra	Select Shadow Yuma
Field Corn	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M Clovitox Plus Cobutox 600 2,4-D 2,4-DB DyVel DSp	Embutox Heat ² Koril Logic M MCPA amine MCPA K-salt ¹ MCPA Na-salt ¹ Mextrol Pardner Topside Tropotox Plus	Badge Banvel II Bromotril Brotex 240 Buctril M DyVel DSp Koril	Logic M MCPA Amine ¹ MCPA K-salt ¹ MCPA Na-salt ¹ Mextrol Pardner				
Liberty Link Corn	Liberty 200 SN							
Roundup Ready Corn	Glyphosate				Glyphosate		Glyphosate	
Sweet Corn	Badge Basagran Basagran Forte Bromotril Brotex 240 Buctril M	DyVel DSp Koril Logic M Mextrol Pardner	Badge Bromotril Brotex 240 Buctril M DyVel DSp	Koril Logic M Mextrol Pardner				
Fababeans	Basagran Basagran Forte				Edge Poast Ultra		Poast Ultra	
Lentils	Heat ² Odyssey ⁴ Odyssey DLX ⁴	Sencor Solo ⁴	Sencor		Arrow 240 EC Assure II Centurion Edge Equinox (wheat, barley) Fusion	Odyssey ⁴ Odyssey DLX ⁴ Poast Ultra Select Shadow Solo ⁴ Yuma	Arrow 240 EC Assure II Centurion Odyssey ⁴ Odyssey DLX ⁴ Poast Ultra Select Shadow	Solo ⁴ Yuma
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Basagran Basagran Forte Clovitox Plus Gladiator Heat ² MCPA amine MCPA Na-salt Multistar Odyssey Odyssey DLX	Pursuit Sencor Solo Topside Tropotox Plus Viper	MCPA Amine ¹ MCPA Na-salt ¹	Sencor	Arrow 240 EC Assure II Centurion Edge ¹ Equinox (wheat, barley) Fusion Odyssey ⁵	Odyssey DLX Poast Ultra Pursuit ¹ Select Shadow Solo Viper ⁵ Yuma	Arrow 240 EC Assure II Centurion Odyssey Odyssey DLX Poast Ultra Select Shadow	Solo Viper Yuma
Potatoes Irrigated (irr)	Sencor		Sencor		Arrow 240 EC Centurion Eptam	Poast Ultra Select Shadow	Arrow 240 EC Centurion Eptam	Poast Ultra Select Shadow

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

⁶ To be used pre-seed or pre-emergence, as a burnoff.

Herbicide Selector Chart – Other Crops

Crop	Volunteer Canola		Wild Buckwheat		Wild Oats		Wild Radish
Beans Check label	Basagran Basagran Forte Solo		Bonanza Edge Rival	Solo Treflan	Arrow 240 EC Assure II Bonanza Centurion Edge Equinox Eptam	Poast Ultra Rival Select Shadow Solo Treflan Yuma	Basagran Basagran Forte
Canary Seed	Badge Banvel II + MCPA Buctril M Curtail M Heat ⁶ Logic M	Mextrol Sword Prestige XC Target Tracker XP	Badge Banvel II Banvel II + MCPA Bromotril Brotex 240 Buctril M Curtail M Heat ⁶	Koril Logic M Mextrol Pardner Prestige XC Sword Target Tracker XP			Banvel II + MCPA
Chickpeas	Sencor Heat ⁶		Authority ² Heat ⁶		Arrow Assure II Centurion Equinox	Poast Ultra Select Shadow Yuma	
Field Corn	Badge Basagran Basagran Forte Buctril M Clovitox Plus	DyVel DSp 2,4-D Heat ⁶ Logic M Mextrol Tropotox Plus	Aatrex Liquid 480 Aatrex Nine-0 Atrazine Atrazine 480 Badge Banvel II Bromotril Brotex 240 Buctril M Cobutox 600 2,4-D 2,4-DB	DyVel DSp Embutox Heat ⁶ Koril Logic M MCPA Amine ¹ MCPA K-salt ¹ MCPA Na-salt ¹ Mextrol Pardner Princep Nine-T	Aatrex Liquid 480 Aatrex Nine-0 Accent	Atrazine Atrazine 480 Princep Nine-T	Basagran Basagran Forte Clovitox Plus ¹ Cobutox 600 2,4-D MCPA amine MCPA K-salt MCPA Na-salt Topside Tropotox Plus
Liberty Link Corn			Liberty 200 SN		Liberty 200 SN		
Roundup Ready Corn	Glyphosate		Glyphosate		Glyphosate		
Sweet Corn	Badge Basagran Basagran Forte	Buctril M DyVel DSp Mextrol	Aatrex Liquid 480 Aatrex Nine-0 Atrazine Atrazine 480 Badge Bromotril	Brotex 240 Buctril M DyVel DSp Koril Mextrol Pardner	Aatrex Liquid 480 Aatrex Nine-0 Accent	Atrazine Atrazine 480	Basagran Basagran Forte
Fababeans	Basagran Basagran Forte		Bonanza Edge	Rival Treflan	Bonanza Edge	Poast Ultra Rival Treflan	Basagran Basagran Forte
Lentils	Heat ⁶ Odyssey ⁴ Odyssey DLX ⁴	Sencor Solo ^{4,5}	Bonanza Edge Heat ⁶ Odyssey ⁴	Odyssey DLX ^{4,1} Solo ^{1,4} Rival Treflan	Arrow 240 EC Assure II Bonanza Centurion Edge Equinox Fusion Odyssey ⁴	Odyssey DLX ⁴ Poast Ultra Rival Select Shadow Solo ⁴ Treflan Yuma	
Peas Check label to ensure chosen chemical or mix is registered for use on the crop	Clovitox Plus Basagran Basagran Forte Gladiator Heat ⁶ Multistar Odyssey ⁵ Odyssey DLX ⁵	Pursuit ⁵ Sencor Solo ⁵ Tropotox Plus Viper	Authority ² Bonanza Edge Gladiator ¹ Heat ⁶ MCPA Amine ¹ MCPA Na-salt ¹ Multistar ¹ Odyssey ¹	Odyssey DLX ¹ Pursuit Rival Solo ¹ Treflan Viper ¹	Arrow 240 EC Assure II Avadex BW Bonanza Centurion Edge Equinox Fusion Gladiator ¹ Multistar ¹ Odyssey	Odysee DLX Poast Ultra Pursuit Rival Select Shadow Solo Treflan Viper Yuma	Basagran Basagran Forte Clovitox Plus ¹ MCPA amine MCPA Na-salt Topside Tropotox Plus
Potatoes Irrigated (irr)	Sencor				Arrow 240 EC Centurion Eptam	Poast Ultra Select Shadow	

¹ Suppression only

² Pre-emergence to crop, post-emergent to weeds

³ Used as crop desiccant

⁴ CLEARFIELD tolerant lentils only

⁵ Non-CLEARFIELD varieties

⁶ To be used pre-seed or pre-emergence, as a burnoff.

Pesticide Application Record

Field description: _____ Acres: _____ Crop: _____

Variety: _____ Date seeded: _____ Fertilizer: _____ Rate: _____ Date: _____

Crop stage: _____ Scouting date: _____ Date results were checked: _____

Pest Weed/Insect/Disease		Density				Results	Field Diagram	
Species	Leaf stage/ Instar/Symptom	Patches	Low	Medium	High			

Comments: _____

Application Information							Environment Information			
Pesticide used	Date and time	Rate per acre	Water volume per acre	Acres per tank	Pesticide volume per tank	Tanks per field	Crop stand	Soil moisture	Temperature	Wind speed and direction
1 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		
2 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		
3 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		

Comments: _____

Note: Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

Pesticide Application Record

Field description: _____ Acres: _____ Crop: _____

Variety: _____ Date seeded: _____ Fertilizer: _____ Rate: _____ Date: _____

Crop stage: _____ Scouting date: _____ Date results were checked: _____

Pest Weed/Insect/Disease		Density				Results	Field Diagram	
Species	Leaf stage/ Instar/Symptom	Patches	Low	Medium	High			

Comments: _____

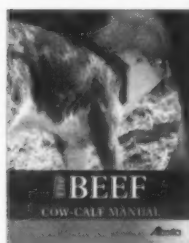
Application Information							Environment Information			
Pesticide used	Date and time	Rate per acre	Water volume per acre	Acres per tank	Pesticide volume per tank	Tanks per field	Crop stand	Soil moisture	Temperature	Wind speed and direction
1 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		
2 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		
3 Lot #: _____							Ex. G. Fr. Pr.	Ex. G. Fr. Pr.		

Comments: _____

Note: Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

Also available from Alberta Agriculture and Rural Development*

(For a full list, call 1-800-292-5697 or see: www.agriculture.alberta.ca/publications)



The Beef Cow-calf Manual

The fourth edition of *The Beef Cow-calf Manual* features 282 pages of the most up-to-date information available for cow-calf producers. You'll find sections about genetics, economics, calf management, nutrition and feeding, animal health, pests, handling facilities and fencing, herd management and Internet resources. Over 250 colour photos, tables and figures help make this all-new book a great resource for both the new and the experienced producer. 282 pages.

Agdex 420/10 \$30.00



How Herbicides Work

How Herbicides Work is for professionals who work with herbicides and may also help producers with an interest in the technical aspects of herbicides. This book covers how herbicides enter and move in plants, how they break down in the plant and soil, how plants develop resistance to herbicides and how herbicides are transferred from sprayer to target. 134 pages.

Agdex 606-2 \$35.00



Silage Manual

Concerned about winter feed for your livestock? Then have a look at the *Silage Manual*. Silage systems can help producers develop nutritious, cost-effective feed supplies. Examining all aspects of silage making will help producers balance costs against benefits and weigh advantages against disadvantages. In the *Silage Manual*, a team of specialists discusses key topics: ensiling process, crops for silage, silage additives and harvesting. 84 pages.

Agdex 120/52-2 \$15.00



Weeds Identification Program CD-ROM

This CD-ROM helps you identify the major economic weeds of Western Canada. It was designed for both the farmer who wants to improve weed management and the agronomist who is providing field services. With information on five grasses and 58 broadleaf weeds, this tool allows you to quickly determine which weed you are dealing with. Once you have identified the weed, you can figure out how to control it.

Agdex CD640-12 \$10.00

* order form on page 491



Insect Identification Program CD-ROM

This comprehensive program about destructive insects in Western Canada covers physical characteristics, damage characteristics, economic thresholds, detection techniques, and more. See how to locate an insect, identify it, and discover its potential harm to your crops. Created by entomology experts at Alberta Agriculture and Rural Development, this CD is richly illustrated with dozens of photographs, and uses video clips showing step-by-step procedures.

Agdex CD620-4 \$30.00



Alberta Forage Manual

The new Alberta Forage Manual, 2nd Edition, offers producers comprehensive information on a range of forage topics: adaptation, legumes and grasses, annuals, mixtures, establishment, fertility, pasture management, harvesting and rejuvenation. In addition, sections on forage pest insects and diseases present detailed discussion of these problems in forage crops, helping producers diagnose damage. The extensive descriptions of forage species and their growth habits will help in planning forage management programs. Fully illustrated with colour images, line drawings, tables, charts and graphs, this forage reference work provides a wealth of information.

Agdex 120/20-1 \$30.00



Pulse Crops in Alberta

Whether you are looking to diversify or already growing them, this book is a "must have" for anyone interested in pulse crops. Learn the basics about pulse production or get more specifics in the full-color pages on field pea, dry bean, lentil and fababean. It also provides information on some lesser known pulses in Alberta: chickpea, fenugreek, grasspea, lupin and soybean. The book is fully illustrated in color with over 250 photographs, charts, illustrations and tables. 150 pages.

Agdex 142/20-1 \$25.00



Commercial Strawberry Production on the Prairies

Specialists from each of the Prairie provinces have contributed their expertise to *Commercial Strawberry Production on the Prairies*. This book provides information about how to start and maintain a commercial strawberry planting, what cultivars are available, what equipment is needed and what food safety guidelines have to be implemented. Colour photos show the common diseases and pests that could affect your commercial strawberry crop. An extensive resource section points you to a wealth of information about strawberry production. 106 pages.

Agdex 232/20-1 \$20.00

* order form on page 491



Common Plants of the Western Rangelands: Volume 1- Grasses and Grass-like Species

The book features black and white illustrations, descriptions and taxonomic keys that help you identify any grass, sedge or rush that grows on western rangelands. 355 pages.

- information on over 200 grasses and grass-like species, handy coil-bound, 6" x 9" field-use size
- hundreds of drawings showing the whole plant, roots, seed heads, close ups of identifying features such as ligules and auricles
- vegetative grass keys, glossary of terms
- detailed written descriptions of growth habits, blades, sheaths, ligules, heads, similar species, habitat and distribution, forage value, and grazing response

Agdex 134/30-1 \$25.00



Common Plants of the Western Rangelands: Volume 2 - Trees and Shrubs

The book features black and white illustrations, descriptions and taxonomic keys to help you identify the trees and shrubs that grow on western rangelands. 192 pages.

- information on 148 species of trees and shrubs, handy coil-bound, 6" x 9" field-use size
- hundreds of drawings showing the vegetative and reproductive features used to identify tree and shrub species
- simplified plant keys that enable you to differentiate one species from the next, glossary of terms
- detailed written descriptions of growth habits, blades, inflorescence, similar species, habitat and distribution, forage value, and grazing response

Agdex 134/30-2 \$20.00



Common Plants of the Western Rangelands: Volume 3 - Forbs

The book features black and white illustrations, descriptions and taxonomic keys to help you identify the forbs that grow on western rangelands. 505 pages.

- information on 249 species of forbs, handy coil-bound, 6" x 9" field-use size
- hundreds of drawings showing the vegetative and reproductive features used to identify forbs
- simplified plant keys that enable you to differentiate one species from the next, glossary of terms
- detailed written descriptions of growth habits, blades, inflorescence, similar species (described and illustrated), habit and distribution, forage value, and grazing response

Agdex 134/30-3 \$30.00

* order form on page 491

Four easy ways to order:

By phone

Call 1-800-292-5697 (toll-free in Canada)

By fax

Send your order to (780) 422-8835

- For free factsheets and books, use the order form on page 492
- For priced products, use this order form

By mail

Mail the appropriate order form (see above) to:

- Alberta Agriculture and Rural Development
Publications Office
7000 - 113 Street
Edmonton, Alberta
Canada T6H 5T6



I enclose my ☐ cheque ☐ money order

or charge my ☐ VISA ☐ MasterCard



(Payable to the Minister of Finance)

Card No. _____

Expiry Date _____ month _____ year

Signature _____

Phone (_____) _____
area code

On-line

Visit our website at www.agriculture.alberta.ca/publications

In addition to housing an ordering system, our site also has many of the free publications available for on-line viewing.

Name _____

Address _____

Town _____ Province/State _____ Postal (Zip) Code _____

Title	Quantity	Price	Total
Shipping and handling (in Alberta \$2.00 per order)			\$
Shipping and handling (other Canadian provinces \$3.50 per order)			\$
U.S. orders add \$10.00			\$
Subtotal (please calculate GST on this amount)			\$
Add 5% GST (Canadian orders only) or 13% HST for N.S., N.B., Nfld., Labrador residents			\$
Total Enclosed			\$

May we send you information on new and revised publications?

- ☐ Yes
☐ No

Payment is required prior to shipping

***Please note:** prices are subject to change

492

POISON CONTROL CENTRE (ALBERTA)

Toll-free Alberta Wide

1-800-332-1414

Calgary Only

(403) 944-1414

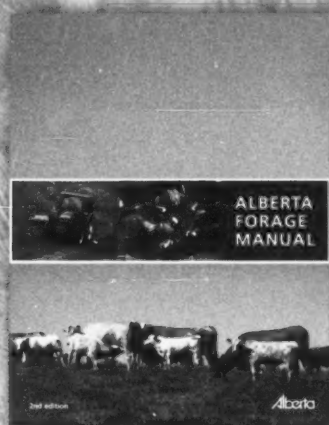
Phone number of the Emergency Department of the hospital in
your area is (403) or (780) _____

When you call the Poison Centre

1. Remain calm.
2. Bring the container and/or label with you to the phone.
3. Be prepared to answer some questions.
 - a. age and weight of patient
 - b. name and amount of product
 - c. **time poisoning happened**
 - d. **any symptoms**
 - e. **circumstances surrounding the incident**
 - f. **your name and phone number**
4. Follow instructions carefully.
5. Keep your line free if the Poison Centre has to return your call.
6. **Do not attempt any additional first aid unless the Poison Centre has instructed you.**

Also Available

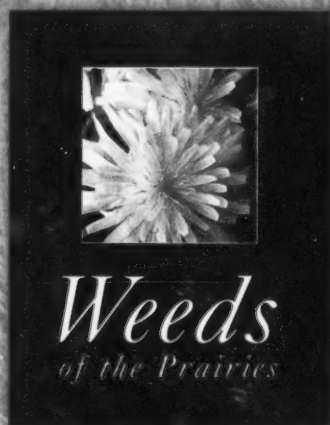
from Alberta Agriculture and Rural Development



Alberta Forage Manual

contains extensive descriptions of forage species and their growth habits to help in planning forage management programs. Fully illustrated with over 350 colour images, plus line drawings, tables, charts and graphs, this forage reference work provides a wealth of information. 350 pages.

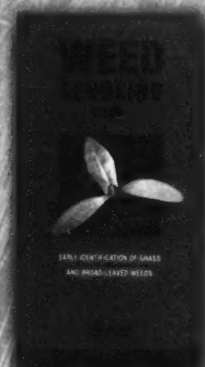
Agdex 120/20-1 \$30.00



Weeds of the Prairies

is a comprehensive field guide to the common weeds across the Canadian Prairie provinces. Detailing 112 weeds, this book gives you over 500 full-colour photos of the weeds at different growth stages. Weeds are colour-coded by flower colour for easy reference. 266 pages.

Agdex 640-4 \$25.00



Weed Seedling Guide

this convenient pocket-sized booklet features over 60 pages of information on 40 broad-leaved weeds and 10 grasses, a table of contents organized by seed-leaf shape to make identification easier, 49 drawings of seed-leaf shapes, 50 colour photos of weed seedlings and a glossary. 65 pages.

Agdex 640-9 \$10.00



Printed in Canada



Order from Alberta Agriculture and Rural Development's catalogue of over 600 information books, fact sheets, videos and CD's. Call our toll-free order line at 1-800-292-5697 and ask for a free copy of our catalogue or visit www.agriculture.alberta.ca/publications

**Government
of Alberta**